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### A FAREWELL LECTURE [1]

BY LORD HORDER, K.C.V.O., M.D., F.R.C.P.Lond.

IN place of the customary "Gentlemen" with which these lectures are prefaced I am to-day privileged to address you as "Colleagues and gentlemen." The compliment paid to me by the presence of so many of my fellow teachers is both graceful and touching. It is also, as compliments are wont to be, expensive, since the occasion which determines it costs me a great deal. Swan songs are prone to be sententious—a quality which I always try to avoid, whether in speech or in action. Personalities I dislike just as much as I dislike sententiousness. I will allow myself one brief deviation from my practice in respect of each of these two antipathies. I admit that if, after all these years, I had no sort of message for those who follow me, I should feel heartily ashamed. I also admit that this, my last clinical lecture at Bart.'s, far from leaving my withers unwrung, strains them to their utmost.

The occasion justifies a departure from custom in regard to these lectures. To-day I am not bringing before you a "difficult case," unravelling its complications as best I can, and trying to make clear the mental process by which this may be done, and thereby invite that drowsiness which, in these circumstances, tends to steal over my audience (pardonable only in the case of my house physician, for has he not already been "bored stiff" by my previous rehearsals in the ward ?). Nor am I bringing a more simple case, which may be taken as a peg upon which to hang a list of causes or symptoms of disease, and thereby stimulate those who scent the possibility of something which is of potential use in another place, a stimulus which extends at times even to a little hurried note-taking (for I have never misconstrued this brief spurt of active, rather than passive, attention on the part of the less frugal minded of my audience). Instead of doing either of these things I propose to say something about clinical medicine itself—that is, about that part of the physician's work to which these lectures are a running commentary.

### "TOUJOURS LES MALADES"

Whatever may be the special branch of medicine that attracts us, it is commonly accepted that it is at the bedside where, on the one hand, the vital expressions of diseases are manifested and where, on the other, the contributions made by the laboratory, both to diagnosis and to therapy, must eventually be tested. "Les malades, toujours les malades." But medicine provides such a large field for human interest and activity that there are many points at which a man may branch off into a whole life's work of relatively detached scientific effort. Any one of these digressions may take him so far away from the patient that, quite joyfully and quite successfully, he may make valuable contributions to what becomes, in effect, pure science. He may then be tempted to consider clinical medicine but a poor affair, scarcely worth the pursuit of a trained intelligence. Whereas I regard it as a very inviting field for the most highly cultivated minds—a field in which meagre achievement, far from indicating an essential poverty in the soil that is being tilled, signifies only that the husbandman is not always as alert and well equipped as he might be. However, what I say this morning is not intended as an apologia for the clinician so much as a brief survey of his place in medicine and how his functions are, in my judgment, best performed.

In the view of some people the clinician has not advanced, or developed, proportionately with those of his colleagues who are primarily concerned with the ancillary subjects of surgical technique, bacteriology, and biochemistry. I cannot accept this estimate, and I think it is due to a false, or a forgotten, conception of the clinician's function. Though this remains what it fundamentally always was—the collection and evaluation of all available data which are pertinent to the diagnosis and the treatment of the sick person—I believe that the growth of the means by which this function is achieved has been even greater in the case of the clinician than in the case of any one of his colleagues, for the reason that the whole of their combined knowledge is available for him if he is familiar with it and cares to use it.

### THREE GREAT ADVANCES

In my own time I have witnessed three great advances in the science and art of clinical medicine, and (though "I speak as a fool") these advances have seemed to me to make the clinician of much greater potential service to the patient than he was before they took place. How much he is actually of greater service depends upon himself, and the degree to which he has absorbed these advances and transmuted them into his practical work.

The function of the old clinicians was not inaptly termed "walking the wards," an expression which has its modern counterpart in "going round." Our predecessors made large observations rather than small, and they acquired a facility in diagnosis and in prognosis which seemed to many quite uncanny. This facility was really due to the fact that they had trained themselves to make a greater number of observations than they were actually aware of. Their eyes and ears and touch and smell were unaided by instruments of precision, and the pitch of excellence to which their senses perforce—and at long last—arrived was very astonishing. But their exactness stopped short at the point where their unaided senses could pierce the mystery no farther and this in many cases was stopping too short to enable them to give the help which the patient needed. For example, septicæmia was only septicæmia, and heart disease, for the most part, was only heart disease.

### THE LESSONS OF THE POST-MORTEM ROOM

Then came the first great advance. With the increased frequency of, and greater thoroughness in, post-mortem examinations, the clinician began to think morbid-anatomically. This was a notable move forward. He was able to visualise the diseased organs as they actually existed during life, and this visualisation gave his clinical methods a clearer purpose and direction. This habit of correlation of the clinical features of the case with post-mortem experience remains, and must of necessity remain, one of the most valuable aids to diagnosis and prognosis. The clinician who relaxes in a punctilious attendance at the post-mortems upon his patients, or upon patients of his colleagues, thinking the time

[1] With acknowledgments to St. Bartholomew's Hospital Journal.

could be better spent in the wards or in the out-patient rooms, is not only denying himself the chief correction to his exuberance and to his vanity, he is departing from the bed-rock of medicine itself. What he says at the bedside may, or may not be, the truth; what he sees in the post-mortem room *is* the truth. In this connexion I should like to enter a plea against too much reservation of post-mortem material for deferred examination. Some such reservation is at times desirable and even necessary, but it should be upon the decision of the pathologist and of the clinician jointly, each having regard to the claims of the other. Be it remembered that diseased organs that are opened at the time of the post-mortem examination, and are seen in relation to the rest of the body, nearly always throw light upon the obscurity that has perhaps been in the minds of those who have seen the "case" during life. Whereas organs that are dissected by the aid of the pathologist's midnight oil may, or may not, illumine his own individual darkness.

### LABORATORY METHODS

The second advance came with the development of laboratory methods, since in these the clinician found new and invaluable aids to his work. The study of the patient *qua* patient was supplemented by the study of materials derived from the patient. Thus we saw the birth of clinical pathology. The past 30 years have witnessed this lusty babe grow up to a vigorous manhood. As is wont with the virile adolescent, there have been times when he thought himself more important than he really was, when he sought to bestride the whole world of medical knowledge, when he firmly believed he *was* medicine rather than merely making his contribution *to* medicine. His incursion into the sick room was apt to be somewhat brusque, not to say at times truculent. Cuckoo-like, he jostled and pushed and oft-times succeeded in ousting his more timid and gentle colleague from the latter's legitimate sphere. He took to describing himself in the telephone directory as "physician," and he invited the credulous sick to consult him. The public, with its child-like confidence in machinery, loved him, welcoming his advent as signalling the millennium of exact medicine, and unaware that the human brain is the best machine of all. A catalogue of the flora of the fauces and/or of the fæces, a complete blood count, a chemical analysis of the urine to the third place of decimals: "What further may be sought for or declared?" Not only was the new gospel about to dispel the darkness that shrouded diagnosis, it was about to illumine the therapeutic field also. The "opsonic index" for an exact diagnosis, the hypodermic syringe, charged with the appropriate antigen, for effective treatment, and medicine was "taped" at last. The clinician came to be regarded by some with amused tolerance; by others, even less generously minded, as obstructive to real progress. Nosology disappeared and pathology contracted down to the name of the infecting agent; patients no longer suffered from diseases but from micro-organisms. "What is the matter with the man in bed 4?" "T.B. . . ."

But fortunately for the patient, for whom, like the soul of Faustus, the powers of good and evil were fighting, some clinicians kept their heads. They absorbed what was good in these clinico-pathological advances, seeing in them important supplemental aids to their methods rather than a substitution for them. But the older and cruder notions of infection had to be entirely revised; and gaps in the knowledge of metabolism had to be filled. Not only was it necessary that the clinician should think morbid-anatomically, it was necessary that he should think bacteriologically and bio-chemically also.

### RÖNTGENOLOGY

Then came the third great advance, and by means of an entirely new tool. I refer to the arrival of roentgenology. Though useful from the first, it has taken a good many years to improve the technique and to get the method under control, but to-day there is probably no more useful addition to the clinician's methods. The exercise of forbearance in interpretation on the diagnostic side, and of moderation in claims on the therapeutic side, have become an important part of the clinician's work.

### ESSENTIAL DATA

I said just now that the fundamental function of the clinician is to collect and to evaluate data. But what data? The clinician is not a *mere* collector of data. If he were, diagnosis would be as easy for one man as for another. Nor is he a mere recorder of cases seen. If he were, the palm would go to the panel practitioner or to the junior casualty physician, though this consideration waives a fact of which we are well aware—that it is possible, nay easy, to see a great number of patients and yet not see their diseases. It is the *essential* data that we want, not the unessential. It is data that are associated, not data that are dissociated. The capacity to neglect is as important as the capacity to take notice. True, the more obscure the case the less we can afford, in the first survey, to omit any examination; but after a time there comes what may seem to some an almost astounding negligence. This is not forgetfulness, nor a lapse from good methods; *it is the ability safely to omit.* Patients' dossiers are apt, in these days, to be so full and so heterogeneous that the courage to say of some of the reports, "noted, nothing doing," is often the first step in the elucidation of the problem. It falls to the clinician alone to become familiar with the range of health, to be sensitive to what lies within it, and to what lies outside it. The exercise of this sensitiveness in any particular case becomes more and more essential the more meticulously exact the reports of the experts may be. And these reports tend to be more and more meticulously exact with the increasing tendency to specialism and the myopia which goes with it. The number of patients whose hearts are healthy is in inverse proportion to the number of cardiologists they consult, and the frequency with which they are "electrocardiographed." An upper respiratory tract which is passed as "normal" by a careful "nose and throat man" will soon be so rare as to merit demonstration at the Royal Society of Medicine.

### BEDSIDE OBSERVATIONS

It has been during the recent period of intensive laboratory investigations on the clinico-pathological side of diagnosis that the notion has arisen that the clinician's observations are not really scientific, that they are of the nature of guess-work, whereas everything that happens in the laboratory is controlled by the infallible rules of logic. The test-tube and the microscope cannot lie. But God alone knows if what the physician thinks is an enlarged spleen *is* the spleen; or if rose spots are not "any old spots"; or the association of a soft and infrequent pulse with a continued high fever is not some odd trick of Nature designed to intrigue the curious-minded; and why

should not a week of intense headache pass away somewhat suddenly and be replaced by a muttering delirium; and an unexplained deafness appear? Funny things like these do happen to people who suffer from a disease of microbic origin. But the one certain thing is that the disease isn't typhoid fever, or any infection in the T.A.B. group, because there is no agglutination of the laboratory stains of those organisms by the patient's serum. Strange, this idea that facts have a different value according as they are observed at the bedside or in the laboratory. Stranger still, the idea that one negative observation in the laboratory should, by responsible clinicians, be regarded as more important than six positive observations at the bedside. "We can never, by a single experiment, prove the non-existence of a supposed effect." If "science arises from the discovery of identity amidst diversity" then it matters not if the identity be discovered by careful observation of the patient clinically or pathologically. The whole question is, is it a *true* identity? But this, in the last resort, depends upon the critical judgment of the observer. Granted that the exercise of judgment at the bedside is more difficult than it is in the laboratory, mistakes in judgment are not confined to the bedside. We have only to send a specimen of the same stool to two, or even to six, bacteriologists, equally expert, to find that failure to "discover identity" is by no means only a bedside difficulty. Here the question of criteria is involved, as we know, and criteria are not always uniform even amongst laboratory workers. Their results are therefore, of necessity, not always comparable. Now the clinician's criteria are, in general, less exact than the pathologist's, nor can they be made so exact very easily; but if they are made severe, as they should be—if nothing is termed positive which is only doubtfully positive; if the clinician's judgment concerning his observations is controlled by reliable technique; if discovered identities are unequivocal—then his "facts" are as scientific and as logical as are those of the pathologist. The truth is that clear thinking, with forbearance, is essential to the satisfactory solution of a diagnostic problem whether the contribution comes from the laboratory or from the bedside.

### MENTAL TECHNIQUE

There is a technique of the mind as well as of the eye and of the hand, and the former is quite as essential as the latter. It is not only what you find *at* the bedside, it is also what you bring *to* the bedside. The eye sees what it takes with it the power of seeing: it is the *mind* that sees. And surely it is the same in the laboratory? In both spheres there comes to some—slowly, painfully, towards the end (alas!)—facility born by patient practice out of time. Clinician and pathologist are more akin than they sometimes realise. Each of them takes a pride (which the other regards as excessive) in his small discoveries, and each of them lacks humility (or so the other thinks) in face of the certain fact that every day, whether it be in the ward or in the laboratory, momentous things are happening under their very eyes, yet they see them not, for they are both under the same ban—they cannot live out of their generation.

### CLINICAL RESEARCH

If, looking back, I can feel satisfaction with any modest effort of my own in the diagnostic field, it is in opposing the tendency of the past two decades towards the divorce of clinical from laboratory methods. In this hospital this divorce has really never occurred. Kanthack and Andrewes and Gordon and Kettle and Canti have been too wise not to see that pathological processes have a unity which centres itself in the patient and that without careful study at the bedside only one part of these processes can be elucidated. It is the close coöperation of both observers, and this alone, that can lead to results that are helpful. We at Bart.'s have been fortunate in this matter, and I hasten to add that any mild strictures of mine refer not to our school, but to a part of the greater world of medicine outside.

But clinical medicine in this greater world is just now coming back into its own. The prince has taken notice of the neglected charms of our modest Cinderella. A marriage is being arranged. Professors are leading her to the altar, and the name of her bridegroom is Research. There is just time for me, as an interested and loving uncle, to give the pair my blessing.

> "Let me not to the marriage of true minds
> Admit impediments. Love is not love
> Which alters when it alteration finds,
> Or bends with the remover to remove:
> O, no! It is an ever fixed mark
> That looks on tempests and is never shaken;
> It is the star to every wandering bark,
> Whose worth's unknown, although his height be taken."

And so is resumed afresh the long line of clinical observers which has been lit by the genius of Hippocrates, of Sydenham, of Trousseau, of Osler, and of many others—masters in clinical research.

### CLINICAL TEACHING

A few words about clinical teaching before I close. Time has not led me to change my view that the best help the clinician can give his pupils during the early part of their career is to insist that they use their words carefully, exactly, and without ambiguity. Next to this, but only by means of this, he can help them to think clearly. This is important, too, for as Thomas Hobbes said "as men abound in copiousnesse of language; so they become more wise, or more mad than ordinary." I may be forgiven for repeating myself and saying that the first text-book of medicine should be Jevons' "Primer of Logic." It costs one shilling but is worth untold gold. Note-taking must never be scamped. What is written about the facts of a case demands the same care as what is said about them. If to these things can be added a thorough drilling in methods of clinical examination we have really accomplished a great deal in the first three months. Be it never forgotten that to watch the teacher's own methods is of greater help in the earlier stages of clerking than to try to understand what he is talking about. Efforts to teach medicine, however tempting, should be resisted. The keen student will teach himself medicine if he is properly trained in these important preliminaries.

### THE CURRICULUM

I wish something could be done to save the clerk's valuable time in the wards by introducing into the pre-clinical studies a number of examinations and methods which have really to do with anatomy and physiology. I have often dealt with this matter, but I make no excuse for referring to it again. The fundus oculi and the membrana tympani are normal anatomical structures, yet few clinical clerks have ever seen them before they enter the wards and, largely as the result of this fact, some have not seen them clearly even when they leave. We could profitably exchange the time spent over theories of colour vision and the intimate structure of the organ of Corti for these important matters. The blood-cells are a part of normal histology but they have rarely been counted, or, if they have, it has only been during the

demonstration of the Thoma-Zeiss pipette. The contours of the abdomen, the reflexes and tendon-jerks, the normal gait, the surface markings of the lungs, the deposits that may occur in urine apart from disease, the flora of the fæces in health . . . is it really economical that the time of the clinicians—and of the senior clinicians—should be taken up in teaching about these things? Mr. Dean, we have praised you, though not more than you deserve, on account of the magnificent laboratories and equipment which you have assembled on the Merchant Taylors' site. Here is another piece of work for you and your colleagues—this adjustment of the pre-clinical studies so that they conform more to the requirements of men who are going to be doctors, and valuable time may be saved for the later years of the curriculum.

### VALE

Well, I must bid you good-bye. It has all been, in schoolboy phraseology, "great fun" and I have thoroughly enjoyed it. The clinician's material has not been confined to the patients in their beds. For there have been the clerks themselves . . . and the rest of the "firm" . . . and the nursing staff . . . and the porters whistling outside the ward, under the echoing shaft of the lift . . . and the buzzer that calls for the anæsthetist who is never there . . . and this lecture theatre. More than all this, there has been the world outside—the domestic circle, the market place, the forum. There has been the whole human comedy as seen by Shakespeare and Molière and Cervantes and the other great clinical observers. I hope I have not put too many of you, whom I have been privileged to teach, out of your stride. I trust my methods, and my teaching, have conformed in some measure to the great traditions of this place. But they have been largely, and of necessity, myself:

"ay, there's the rub."

So now I doff my ward coat and hand it to you, Evans, my friend. Gow and you have been loyal, inspiring, and very charitable colleagues, and I tender you my most sincere thanks. God bless you, and God help you!

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# EXOPHTHALMOS FOLLOWING THE ADMINISTRATION OF THYROID EXTRACT *

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One of the most puzzling of the many problems arising out of the state of thyrotoxicosis is the mode of production of exophthalmos. There is at present no satisfactory explanation either of the nature of the changes in the orbit which lead to exophthalmos, nor of the way in which these changes are associated with thyrotoxicosis. The difficulty of explaining the exophthalmos is enhanced by the fact, which is generally admitted, that the administration of thyroxine or of thyroid extract, whether experimentally to animals or therapeutically to man, does not as a rule lead to exophthalmos. The rarity of this event in man may be gauged from the fact that not more than about twenty instances have been reported. The development of progressive exophthalmos in patients who have previously undergone subtotal thyroidectomy for thyrotoxicosis is a closely related phenomenon, since this may be precipitated by the administration of thyroid extract to correct post-operative hypothyroidism. The object of this paper is to report a new case of exophthalmos following the administration of thyroid extract. The significance of this sequence of events is discussed in the light of this and previously reported cases and of recent experimental work on exophthalmos.

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### AUTHOR'S CASE

An unmarried Hebrew woman, aged 38, was referred to me from Sir Stewart Duke-Elder's clinic at the Royal London Ophthalmic Hospital on May 14th, 1934. Since the age of 5 she had suffered from epileptic fits, which were mainly nocturnal, and occurred almost every night during her sleep, though in addition she used to have one or two every week during the day. Her menstrual history was normal.

In October, 1923, in addition to bromide and iodide she was given thyroid tablets, grs. 2, twice a day for three months. In 1926 she had a further course of thyroid extract for three months and again in 1928. In 1929 she again took thyroid extract until February, 1930. In October, 1930, she started to take ½ grain of thyroid extract, and then 1 grain, twice daily, and had taken the thyroid almost continuously ever since. During the whole of this period she had been taking bromides almost constantly and occasionally Luminal. During the three and a half years before she came under observation she must have taken approximately 2000 grains of thyroid extract.

In the middle of April, 1934, the left eye was first noticed to be prominent. When she first attended the Royal London Ophthalmic Hospital her condition was as follows. Of somewhat retarded mental development. Rather obese. Weight 11 st. 6 lb. (Average weight 8 st. 10 lb.) Height 4 ft. 11½ in. Thick, dark hair on scalp. Heavy eyebrows. Growth of hair on lips and chin, shaved. Thyroid not visibly or palpably enlarged. Pulse regular, rate varying between 90 and 104. Blood pressure 135/80. Fine tremor of hands. The left eye protruded 4 to 5 mm. in front of the right and the left upper lid was retracted. No orbital irregularity was discovered. The ocular fundi were normal and visual acuity was 6/6 in both eyes. Central nervous system, heart, lungs, and abdomen were normal. The urine contained a trace of albumin and no sugar.

The administration of thyroid extract was at once suspended. By July 23rd the patient's pulse-rate had dropped to from 80 to 84. The state of her eye at this time is shown in Figs. 1 and 2.

She was admitted to the London Hospital on Oct. 4th, 1934 (No. 41578). The exophthalmos had now diminished considerably (Figs. 3 and 4) and her weight was 11 st. 12½ lb. Radiograms of the skull showed no abnormality. Her basal metabolic rate on Oct. 19th was plus 9·2 per cent. and on Oct. 21st plus 4 per cent. Her blood Wassermann reaction was negative. While in hospital she had six epileptic fits. She was discharged from hospital on Oct. 23rd, 1934, and has since been under observation as an out-patient. The exophthalmos steadily diminished (Figs. 5 and 6) until in April, 1935, the left eye was only 1 mm. in front of the right. The difference in November, 1935, was scarcely perceptible (Figs. 7 and 8). After the withdrawal of the thyroid extract her weight steadily increased until in May, 1935, it was 12 st. 8 lb., since when she has been on a reducing diet. Her epileptic fits have responded well to luminal and bromide, but she still has an attack occasionally.

In this patient, therefore, the unilateral exophthalmos, which followed the prolonged but intermittent administration of thyroid extract, subsided almost completely within a year of the withdrawal of thyroid. It is noteworthy that the patient showed signs of endocrine abnormality—namely, obesity and excessive hairiness.

FIGS. 1 and 2.—The patient on July 25th, 1934.

FIGS. 3 and 4.—Oct. 22nd, 1934.

PREVIOUSLY REPORTED CASES

*Béclère's Case* (1894).[1]—Female, aged 34. Had been treated for myxœdema by means of thyroid gland. By mistake she took 92 grammes of thyroid gland in eleven days. After this she developed exophthalmos and a staring expression, tremor of the arms, tachycardia, instability of pulse, elevation of the temperature, insomnia, agitation, polyuria, glycosuria, albuminuria, and paraplegia. The paraplegia, in view of a history of previous hysterical symptoms, was regarded as hysterical.

*von Notthafft's Case* (1894).[26]—Male, aged 43. Suffered from increasing obesity and treated himself with thyroid. Within about five weeks he took nearly a thousand tablets of 0·3 gramme Burroughs Wellcome's thyroid preparation. During the five weeks he lost 28 lb. in weight, from 220 lb. to 192 lb. During the third week he began to develop symptoms. At the end of five weeks he showed moderate exophthalmos, with lid lag. His face was flushed and the whole skin moist. There was a gross tremor, most severe in the hands. The pulse-rate was 120. The thyroid was not visibly or palpably enlarged.

*Lawford's Case* (1900).[10]—Female, aged 34. Had suffered from myxœdema for five years. Thyroid extract administered, dose not stated. As she benefited greatly, the treatment was interrupted but was resumed 4½ years later. After one week the eyes became prominent and the exophthalmos steadily increased. She did not complain of palpitation and was not emotional. The thyroid gland was scarcely felt, so was not enlarged.

*Ulrich's Case* (1900).[25]—Female, aged 46. Had suffered from myxœdema for ten years. On thyroid treatment (0·05 × 2) there was rapid improvement and her hair grew again, but she developed exophthalmos, tachycardia, excessive sweating, and progressive wasting, resembling a patient with Basedow's disease.

*Stegmann's Case* (1906).[24]—Female, aged 14. Had suffered from her fourth year from slight swelling of the neck, which gradually increased in size. She was given 1½ Thyroidin tablets per day. She rapidly developed severe palpitations and the treatment was discontinued. There was, however, only temporary improvement and three months after taking the thyroid she began to suffer from palpitations and, a month later, protrusion of the eyes began to develop. Eight months after the beginning of the treatment her weight had fallen from 64 to 46·7 kg. She exhibited gross exophthalmos and a diffuse, soft, visibly pulsating enlargement of the thyroid, very severe tremor, and a pulse which was very irregular and lay between 130 and 150 in rate. The heart was slightly enlarged. Her general condition improved greatly following X ray irradiation of the thyroid.

*Pulawski's Case* (1912).[21]—Female, aged 47. Had had a goitre for 18 years. As it began to increase in size she was ordered to take thyroidin. During four weeks she took 38 tablets (Poehl). She began to lose weight and suffered from palpitations. Four months after beginning to take the thyroid she had slight exophthalmos and Stellwag's sign was positive. She was emaciated and nervous and tremulous, with a pulse-rate of 120. The goitre was firm but did not pulsate. The patient refused operation but improved slightly on medical treatment.

*Holböll's Case* (1927).[8]—Female, aged 46. Increased steadily in weight after the menopause. For 50 days she took thyroid gland tablets (Medix, strength No. 4, 1 tablet a day). She began to suffer from nervousness, tremor, and palpitation and, later, exophthalmos, sweating, and enlargement of the thyroid developed. The loss of weight was progressive. Four months after beginning to take the thyroid extract the typical picture of exophthalmic goitre was present. The pulse-rate ranged between 100 and 140. The basal metabolic rate was 157 per cent. She became delirious and died one month later. There was no autopsy.

*H. U. Møller's Case* (1928).[16]—Female, aged 49. Had been taking thyroid preparation for seven years. She developed unilateral exophthalmos, for which no local

FIGS. 5 and 6.—Dec. 31st, 1934.

FIGS. 7 and 8.—Nov. 28th, 1935.

cause could be found on ophthalmological and X ray examination. She also showed tachycardia, tremor, goitre, glycosuria, fasting hyperglycæmia (0·137 per cent.). The thyroid administration was discontinued. Six months later the goitre and exophthalmos persisted but the pulse-rate was normal. The diabetes proved to be of a very benign character.

*E. Møller's Case* 1 (1930).[15]—Female, aged 49. Artificial menopause induced four years previously with X rays, owing to uterine fibroids. After this there was some increase in weight and she began to take thyroid extract. In the course of six weeks she took between 110 and 120 thyroid gland tablets (Medix, strength No. 1, three tablets a day). She developed nervousness, insomnia, tremor, palpitation, dyspnœa, diarrhœa, profuse sweating, thirst, and faintness. Goitre appeared and exophthalmos was noted. She lost 21 kg. in weight during three months. The basal metabolic rate was 152 per cent. and the patient was regarded as a typical example of severe thyrotoxic goitre. She became delirious and later comatose and died seven months after beginning to take the thyroid.

Post-mortem examination. The thyroid gland was enlarged, without cysts or hæmorrhages. Microscopically, the follicles were of very unequal size. The epithelium was flat, cubical, or cylindrical. In most follicles papillomatous excrescences were found consisting of thin septa of fibrous tissue covered with flat or cubical epithelial cells. No colloid was found anywhere and there was no leucocytic or lymphocytic infiltration. Vascularisation was normal. The brain, cerebellum, and medulla oblongata were microscopically normal and sections from the cerebral cortex, optic thalamus and caudate nucleus, cerebellum, and from the borderline between the pons and medulla were all normal, except for a mild degree of hyperæmia.

*E. Møller's Case* 2 (1930).[16]—Male, aged 49. Developed myxœdema in 1913. From 1916 until 1924 thyroid extract was given in an average dose of 4 centigrammes daily. This removed all the symptoms and the patient was very well and able to work. In 1924, without any discoverable cause, palpitation, nervousness, feeling of heat, increased sweating, and tremor of the hands developed. The pulse-rate rose to about 90 and slight exophthalmos was noted. At the beginning of 1930 there was glycosuria. At this time there was bilateral exophthalmos with slight œdema of the eyelids and weakness of ocular convergence. Pulse-rate ranged between 90 and 100. There was slight rapid tremor of the hands. The thyroid was not markedly palpable. The urine was normal, except for an occasional, slight alimentary glycosuria. The blood-sugar was normal. The patient was nervous and restless. The basal metabolic rate was plus 78 per cent. The exophthalmometer measured: right 25 mm., left 24 mm.

*Moorhead's Case* (1931).[18]—Female, aged 54. In 1924 was considered to be suffering from myxœdema and thyroid extract was prescribed, with much benefit. At the beginning of 1926 the dose of thyroid extract was increased to grs. 12½ daily and this dose was taken continuously throughout that year. Early in 1927 it was noted that her right eye was much more prominent than her left. At this time the right eye was extremely prominent and showed well-marked von Graefe's sign, while the left appeared normal. The patient was extremely nervous and restless and suffered from insomnia and loss of weight. The pulse was rapid, the rate being 140. The thyroid gland could not be felt. The administration of thyroid extract was stopped and the patient was put to bed and treated with bromides. In two months the symptoms had largely disappeared and after six months the patient was practically well. As the general symptoms subsided the exophthalmos diminished but 18 months after the onset of hyperthyroidism the right eye was still somewhat more prominent than the left.

*Hurxthal's Cases* (1931).[6]—Hurxthal states that he was able to find 40 cases in which there seemed to be a history of dieting or the use of thyroid extract in patients suffering from exophthalmic goitre. Of this number, however, only 9 could be selected in which it was felt that there was no question as to the onset of exophthalmic goitre following one or other of these procedures. Of these 9 patients 7 had taken thyroid extract.

*Hurxthal's Case* 1.—Female, aged 33. In order to reduce weight took an unknown dose of thyroid extract for one year. Her weight fell from 180 to 130 lb. She developed typical exophthalmic goitre, with pulse of 92, basal metabolic rate plus 36. Subtotal thyroidectomy was performed and one year later weight was 162 lb., pulse-rate 68, basal metabolic rate plus 20.

*Hurxthal's Case* 2.—Female, aged 51. Took 1 grain of thyroid extract daily for six months. Weight fell from 164 to 139 lb. She developed exophthalmic goitre. Pulse-rate was 76, basal metabolic rate (after Lugol's solution) plus 19. Subtotal thyroidectomy was performed. One year later pulse-rate was 68, weight 146 lb., basal metabolic rate minus 6.

*Hurxthal's Case* 3.—Female, aged 43. Took an unknown dose of thyroid extract for five months, in order to reduce weight. Weight fell from 162 to 131 lb. She developed a swelling of the neck and presented a picture of typical exophthalmic goitre with pulse-rate of 108 and basal metabolic rate plus 45. Subtotal thyroidectomy was performed and later the weight was 138 lb., pulse-rate 78, and the basal metabolic rate minus 12.

*Hurxthal's Case* 4.—Female, aged 38. Took thyroid extract in unknown dosage for three months. Weight fell from 165 to 135 lb. She developed typical exophthalmic goitre, with pulse-rate of 118, basal metabolic rate plus 18. Subtotal thyroidectomy was performed. Basal metabolic rate one year later was plus 5, pulse-rate 92, weight 145 lb.

*Hurxthal's Case* 5.—Female, aged 19. For two months took one tablet of thyroid extract three times a day in order to reduce weight. Weight fell from 180 to 165 lb. She developed a typical exophthalmic goitre, with marked exophthalmos, a large hyperplastic thyroid gland; the basal metabolic rate was plus 19, the pulse-rate 104. Subtotal thyroidectomy was performed. Six months later pulse-rate was 58, weight 187½ lb. and the basal metabolic rate minus 1.

*Hurxthal's Case* 6.—Female, aged 55. Took 2 grains of thyroid extract three times a day for seven months and lost weight from 191½ to 158½ lb. This patient developed the typical picture of toxic adenoma of the thyroid with a small firm gland, containing small adenoma and no exophthalmos. Her basal metabolic rate was plus 36, her pulse-rate 106.

*Hurxthal's Case* 7.—Female, aged 54. In order to reduce weight first took a restricted diet for six months. She lost 20 lb. and was then given thyroid extract for about six months. Six months after stopping the thyroid extract she presented the picture of severe exophthalmic goitre, with congestive heart failure and auricular fibrillation. Her weight was 142 lb., her pulse-rate 116, and her basal metabolic rate plus 58. Subtotal thyroidectomy was performed in two stages and one year later her weight was 148½ lb., her pulse-rate 96 and regular, and her basal metabolic rate minus 1.

It will be seen that exophthalmos is specifically mentioned as being present in only 1 of Hurxthal's 7 cases. It is noted as having been absent in 1 case and in the 5 remaining cases the condition was said to be one of exophthalmic goitre or typical exophthalmic goitre. It may reasonably be presumed that exophthalmos was present in these cases also. Hurxthal states that with the exception of one patient, who was not operated on, the typical pathological picture of hyperplasia of the thyroid was found, the glands being in all cases enlarged clinically and diffusely hyperplastic.

In the 19 reported cases thyroid extract was taken for obesity in 10, for myxœdema in 6, for goitre in 2, and for epilepsy in 1. In most cases the administration of thyroid extract appears to have initiated a condition closely resembling if not identical with exophthalmic goitre, which persisted or grew worse after withdrawal of the thyroid extract. In one case, E. Møller's Case 1, it proved fatal; in Hurxthal's cases it was treated by subtotal thyroidectomy, and

in Stegmann's case it was relieved by X ray irradiation of the thyroid. Pathological changes in the fatal case and in Hurxthal's cases appear to have been those of typical exophthalmic goitre. In 2 cases no mention is made of enlargement of the thyroid, and in 2 other cases there was a goitre before thyroid extract was administered. In the remaining cases the thyroid became enlarged in 10, while no enlargement was noticed in 5. In 2 cases in which the thyroid was not found to be enlarged, Moorhead's case and my case, the condition differed from typical exophthalmic goitre in that the patient began to improve as soon as the thyroid extract was withdrawn and made a recovery which was complete except for very slight residual exophthalmos. In 3 of the 19 cases the exophthalmos was noted as unilateral.

### RÔLE OF THYROXINE IN THE PRODUCTION OF EXOPHTHALMOS

Since a very large number of persons take thyroid extract for long periods, some even in excessive doses, without developing exophthalmos, and since thyroxine fails to produce exophthalmos when given experimentally to normal animals, it seems probable that some other factor than the ingestion of thyroid extract or thyroxine is necessary in order that exophthalmos may develop. Recent experimental work yields some support for this view. Justin-Besançon, Kohler, Schiff-Wertheimer, and Soulié,[7] working with dogs, have found it possible to produce exophthalmos by means of various drugs which stimulate the sympathetic nervous system. These workers have shown that such drugs differ from one another in their relative influence upon the eye and upon other structures innervated by the sympathetic. Thus the least doses of substances of the adrenaline group which had a powerful vasoconstrictor effect led to only a feeble exophthalmos. On the other hand, other sympathomimetic drugs, such as ephedrine or ephedrone, caused a very marked exophthalmos in doses which produced a rise of blood pressure equal to, or even less than, those obtained with adrenaline. Other drugs, such as tyramine, phenylethylamine and paramethylethylamine, fell between these two groups in their relative influence on the arterial pressure and on protrusion of the eyeballs. The same workers were unable to produce exophthalmos in dogs by means of thyroxine, even when given in large and repeated doses sufficient to cause rapid emaciation and a marked tachycardia. They found, however, that thyroxine appeared to sensitise the eye to sympathomimetic drugs, and that when thyroxine was given either before or after the administration of such a drug it was possible to produce exophthalmos by means of a dose of a sympathomimetic drug previously inadequate to do so or to obtain a much greater degree of exophthalmos than could be evoked by the sympathomimetic drug alone. Labbé, Villaret, Justin-Besançon, and Soulié [9] have investigated this synergic effect of thyroxine upon sympathomimetic drugs in a patient who, in order to reduce her weight, took 10 mg. of thyroxine daily by the mouth. The patient soon presented signs of hyperthyroidism: severe and rapid emaciation, tachycardia, insomnia, and rise of basal metabolic rate, but at no time was there exophthalmos. They were able to produce a transitory exophthalmos, however, by giving to this patient on one occasion ephedrine and on another occasion ephedrone in combination with thyroxine. The same workers claim to have produced exophthalmos in a patient suffering from spontaneous hyperthyroidism but without showing this symptom by the administration of ephedrine, and they quote an observation of Sainton [22] on a myxœdematous patient who developed exophthalmos when treated with thyroxine and adrenaline in combination.

These observations suggest that thyroxine while unable to produce exophthalmos alone can do so in combination with a substance capable of stimulating the sympathetic.

### RÔLE OF THE THYROTROPIC HORMONE OF THE PITUITARY IN THE PRODUCTION OF EXOPHTHALMOS

The discovery of the thyrotropic hormone of the pituitary has opened a new road of approach to the problem of the pathogenesis of exophthalmos. Marine and his collaborators [11–14] in a series of experiments first found that bilateral exophthalmos could be produced in rabbits maintained on a diet of alfalfa hay and oats by means of the daily intramuscular injection of methyl cyanide. In such animals the exophthalmos was associated with thyroid hyperplasia, but the same workers found that exophthalmos was more easily produced and more marked in rabbits from which the thyroid had been removed. They next succeeded in producing exophthalmos in guinea-pigs by means of the administration of the thyrotropic hormone of the pituitary and found that exophthalmos occurred as readily and usually earlier in thyroidectomised than in intact animals.

Marine and Rosen conclude from these experiments that "the exophthalmos was brought about by the stimulating action of the thyrotropic factor of the anterior pituitary and that the thyroid gland took no positive part in causation." They consider that thyroidectomy stimulates the anterior pituitary to secrete more thyrotropic hormone. They found that removal of the superior cervical ganglion of the sympathetic abolished exophthalmos, whether caused by methyl cyanide or by the thyrotropic hormone of the pituitary, and conclude from this that the thyrotropic hormone causes exophthalmos by acting through a nervous mechanism.

Friedgood [4] has observed the development of exophthalmos in 9 guinea-pigs out of 30 injected with anterior pituitary extract. In the first period following the beginning of daily injection of the extract, a prompt increase in the basal metabolic rate, associated with an increase in the basal pulse-rate and a decrease in the basal weight, was observed. The basal metabolic rate reached its maximum between the seventh and fourteenth day of treatment. After this the animal passed into a second period distinguished by a striking refractory state or remission, during which the basal metabolic rate returned to normal or might even fall below normal. Although slight prominence of the eyes occurred in several guinea-pigs towards the tenth day of the experimental period, when the basal metabolic rate was approaching its highest level, the exophthalmos was much more marked when it developed after the animal had entered the refractory period, and a striking exophthalmos was seen only in those animals which were injected over a period of several months, and especially in those which finally developed abnormally low basal metabolic rates. Friedgood concludes that these experiments indicate that the exophthalmos is produced independently of the thyroid secretion which causes the elevation of the basal metabolic rate, and that the anterior pituitary extract is more capable of inducing exophthalmos when the animal is not under the influence of hyperthyroidism but rather in a hypothyroid state. Scowen and Spence [23] also observed exophthalmos in 3 out of

14 guinea-pigs treated with the thyrotropic hormone of the pituitary.

### RÔLE OF HYPOTHYROIDISM IN THE PRODUCTION OF EXOPHTHALMOS

The observation that hypothyroidism might, in certain circumstances, predispose to the occurrence of exophthalmos seems first to have been made by Kunde,[8] who noted that although exophthalmos could not be produced in dogs by feeding with thyroid and only questionably in normal rabbits, marked exophthalmos developed when thyroid was fed to rabbits which had been rendered myxœdematous by thyroidectomy. Marine and his collaborators and Friedgood, in the experiments described in the previous section, observed that hypothyroidism exercised a similar predisposing influence on the production of exophthalmos by methyl cyanide and the thyrotropic hormone of the pituitary. The rare occurrence in man of progressive exophthalmos developing after subtotal thyroidectomy appears to be in some respects similar. Burch[2] has recently reported one case of this, Zimmerman[27] 8 cases, Naffziger[19] one case, and Earnest and Serger[3] one case. Naffziger and Jones[20] have discussed the surgical treatment of the condition. All these cases have been observed in the United States. I have seen two examples in this country. This condition will not be discussed in detail now as it is proposed to do this in a later communication. Its interest, for the present purpose, lies in the association between the development of exophthalmos and hypothyroidism. The usual sequence of events is as follows. A patient suffering from hyperthyroidism, with or without exophthalmos, undergoes subtotal thyroidectomy. Several months after the operation progressive exophthalmos develops, associated with ophthalmoplegia and, in some cases, with papillœdema and visual failure. This may occur when the patient is suffering from postoperative hypothyroidism as indicated by a subnormal basal metabolic rate, and it has sometimes followed the administration of thyroid extract in an attempt to correct postoperative hypothyroidism. Progressive exophthalmos occurring during postoperative hypothyroidism, recalls the experimental observation of Marine and his collaborators, and Friedgood, that exophthalmos could be produced by the thyrotropic hormone of the pituitary in animals that had been deprived of their thyroid glands or during a phase of relative hypothyroidism. Nevertheless, in some instances, the development of exophthalmos appears to have been precipitated or accelerated by the administration of thyroid extract in individuals during the phase of postoperative hypothyroidism.

Since thyroid extract is commonly administered either for the relief of myxœdema or in the treatment of obesity, it is naturally in these cases that we should expect to find examples of exophthalmos appearing after the administration of thyroid extract. Such cases cannot afford statistical evidence that hypothyroidism plays a part in the production of the exophthalmos. Nevertheless, in view of the experimental and clinical facts just cited, it is probable that it does so.

### UNILATERAL EXOPHTHALMOS IN THYROTOXICOSIS

The exophthalmos, in the patient reported in this paper, was strictly unilateral. It is a minor puzzle that an ocular symptom associated with a state of general intoxication should sometimes be unilateral. In two other reported cases of exophthalmos following the administration of thyroid extract—H. U. Møller's and Moorhead's cases—this symptom was unilateral. Unilateral exophthalmos sometimes occurs in spontaneous thyrotoxicosis. It was also rarely observed by Justin-Besançon and his collaborators in their experiments with sympathomimetic drugs, and Friedgood states that in all his guinea-pigs in which exophthalmos was produced by the thyrotropic hormone of the pituitary, the symptom was unilateral at some stage.

### CONCLUSIONS

It is clear that the rôle of the thyroid in the pathogenesis of exophthalmos is by no means simple. Certain conclusions, however, can be drawn from the experimental and clinical facts already described. (1) The administration of thyroid extract or thyroxine to normal animals and human beings is not, as a rule, followed by the development of exophthalmos. (2) Exophthalmos can be produced experimentally by the administration to animals of drugs which stimulate the sympathetic nervous system. (3) Thyroxine appears to facilitate the action of such drugs in producing exophthalmos. (4) Exophthalmos can be produced by the thyrotropic hormone of the pituitary both in intact animals and in animals from which the thyroid has been removed, and there is some evidence that this hormone produces exophthalmos more readily in the presence of hypothyroidism. (5) Progressive exophthalmos may develop spontaneously following subtotal thyroidectomy in man even when the basal metabolic rate is subnormal, or may be precipitated in such individuals by the administration of thyroid extract. (6) Very rarely the administration of thyroid extract for the treatment of myxœdema, the relief of obesity, or some other purpose, is followed by the development of exophthalmos, and an example of this is reported. (7) It is probable, therefore, that when exophthalmos follows the administration of thyroid extract this is not a direct result of the action of the thyroid extract, but is due to some other substance which in certain rare individuals is produced in response to thyroid extract. Experimental evidence suggests that this substance may be the thyrotropic hormone of the pituitary.

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# EARLY AMPUTATION FOR SEVERE CRUSHING OF LIMBS

## A NOTE ON TWENTY CASES

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THIS paper is written with the object of encouraging very early amputation in cases where limbs have been severely crushed. The temptation to delay intervention is easily understood; the gravity of the injury dissuades the surgeon from advising the remedy of prompt amputation, even though the pulse be satisfactory and the patient's condition fair. If on the contrary the general condition is less favourable, there is unfortunately a still more plausible pretext for waiting. I have twice been persuaded to adopt this policy of delay, and I have watched the state of two patients, neither of whom was exsanguinated, change in a couple of hours—in spite of saline infusion and warmth—from "fair" to "moderate," and from "moderate" to moribund. Their deaths and the knowledge that others were dying in like circumstance led me to consider the possibility of saving life by very early amputation.

The theme is of course by no means new. Thirty-three years ago Harvey Cushing (Ann. of Surg., 1902, xxxvi., 321) made a clear pronouncement regarding primary amputation that is still admirably modern, but this teaching is far too often forgotten. I venture to give it fresh emphasis by the following review of a rather intensive experience.

In fourteen months (1933–34) I have collected 20 cases with severely crushed limbs, all of which were treated at Kasr-el-Aini Hospital by early amputation. Of these, 19 were consecutive cases in the surgical unit, and were amputated by me; one was operated on by my colleague, Dr. Zacharia, and is included through the courtesy of Dr. Abdel Wahab Mooro, F.R.C.S. This last—a striking case of double amputation—will be specially referred to below.

Of the 20 patients 2 died; one of them suffered from other fractures and a severe head injury; the other, a woman aged 50, had her thigh amputated. In this woman and in all the surviving cases, the dominant lesion was crushing of the limb; other injuries of small importance, except in one patient who had fracture of the contralateral femur.

The method of treating these cases at present employed in the surgical unit at Kasr-el-Aini has been gradually developed under the guidance of its director, Prof. A. K. Henry, from the experience summarised in the following paragraphs. I shall therefore describe it last.

### DEFINITIONS

It is essential in the first place to define what is meant by severe crushing of a limb. Imbert in 1911 pointed out that many crushes carry in themselves little or no risk to life (Jour. de Chir., 1911, p. 365). Amongst these minor crushes he included those which affect the hand and the anterior half of the foot [1] Leriche in 1926 once more emphasised the fact that these injuries must not be called severe crushes—*grands écrasements;* he reserves this term for more proximal injuries which present the following five characteristics: (1) laceration and extensive stripping of the skin; (2) pulping of the muscles; (3) lesions of important vessels; (4) lesions of important nerves; (5) comminution of bone. Each of the 20 cases in my series conformed to this description and I have grouped them as follows:—

*Group I.*—Severe crushes involving the entire foot requiring amputation in the leg (3 cases).

*Group II.*—Severe crushes in the leg or forearm requiring amputation at a more proximal level in the leg or arm (7 cases—2 of arm; 5 of leg).

*Group III.*—Severe crushes in the leg or arm requiring amputation in the thigh or arm, or double amputation of the leg (10 cases—1 of arm; 1 (double) of legs; 8 of thighs).

*Causation.*—The crushing injuries in this series were due to the following causes: tram-cars, 8; motor-cars, 4; falls from a height, 4; machines, 2; fall of a stone, 1; train accident, 1.

*Age.*—The average age of the twenty patients was 17½ years; fourteen of them were aged 13 or under.

*Sex.*—There was only one female in the series; she was aged 50.

### GENERAL CONDITION OF PATIENTS WITH CRUSHED LIMBS

*Pulse-rate on admission.*—A striking feature is the number of cases that were admitted with relatively slow pulses, in spite of their severe crushes, and in spite too of their youth. Thus in 10 patients the pulse was under 100 on admission. (See Table.)

| Group. | Pulse-rate on admission. | | |
|---|---|---|---|
| | Average. | Maximum. | Minimum. |
| I. (3 cases) .. | 98 | 109 | 92 |
| II. (7 ,, ) .. | 95 | 110 | 74 |
| III. (10 ,, ) .. | 96 | 120 | 70 |

Two time-intervals were recorded in each case: (*a*) the interval between the time of accident and the time of operation, and (*b*) the interval between the time of admission and the time of operation.

The *accident-operation interval* (*a*) was 3½ hours or under in all except three cases—two in Group I. with intervals of 5 and 4¼ hours respectively, both of which came to operation with fast pulses, and one anomalous case in Group III. with an interval of 7½ hours. The average accident-operation interval in the entire series of 20 cases was just over 2½ hours.

The *admission-operation interval* (*b*) averaged just over 1 hour, with a maximum of 2 hours and 10 minutes, and a minimum of 15 minutes.

The *pulse-rate during the admission-operation interval.*—Observation showed that the pulse-rate during interval (*b*) increased in 10 cases, in spite of restorative treatment, remained unaltered in 3 cases, and diminished in 6 cases. (In one early case the preoperative pulse was not noted.) In one case of the ten, where the pulse-rate increased, the pulse, which on admission was 100, became imperceptible before operation. The average *rise* in the other nine cases was 24 beats, with a maximal increase of 73, and a minimum of 2. The average *fall* in 6 cases where the pulse-rate diminished was 9·8 beats with a maximal fall of 16 and a minimum of 2.

*Note.*—In two cases, though the pulse-rate observed immediately before operation was faster than it was on admission, there had been an *intermediate* fall in rate under the influence of restorative treatment. The best moment for intervention was therefore missed in these cases, though fortunately without fatal result.

[1] This distinction is essential. Prof. Henry, at a meeting of the Egyptian branch of the British Medical Association in 1930, showed five cases with tarso-metatarsal crushes—treated conservatively by local resection of the crushed tissues—which had run aseptic courses.

### EFFECT OF DELAY IN AMPUTATION

It is shown above that the average admission-operation interval (*b*) was short—just over one hour. In three cases, however, this interval was unavoidably extended, as the theatres were all occupied. The effect of this enforced postponement was striking. The pulses, which had been relatively slow and favourable at the times selected for operation, rose in each case to an alarming frequency during the comparatively short period of delay. The following paragraph gives details of one such case.

GROUP III. (No. 22359).—Dr. Zacharia's case of double amputation. Male, aged 12. Tram-car accident, Dec. 9th, 1933. Crush of the middle and upper part of right leg; continuity only maintained by skin. Left foot stripped of soft tissues, also left leg to level of lower third. Pulse on admission 100 (Temp. 36·8° C.). Accident-operation interval 1 hour 50 mins. Operation was fixed for half an hour after admission. Pulse at this time was still 100 and of fair tension. Operation had to be postponed for an hour. During this hour the pulse became imperceptible. Under ether, disarticulation at right knee; amputation at the middle of left leg. Duration of operation 30 minutes. Pulse again became countable at 140 about 20 hours after operation. Re-amputation, right thigh, on Feb. 21st, 1934. Discharged, healed, after 80 days.

Two other "delayed," but ultimately successful cases—one of the patients, besides a pulped right foot and lower third of leg, had fracture of the left femur—showed similar alarming accelerations. Thus in three patients when amputation could not be performed at the time fixed, the pulse-rate rose respectively in 2 hours from 96 to 140, in 1½ hours from 102 to 175, and in 1 hour from 100 to "imperceptible."

It will be seen therefore that these cases of postponed amputation serve, though unintentionally, as control experiments. They suggest two conclusions regarding the early treatment of severely crushed limbs. (1) When the pulse is favourable the opportunity of amputation should be seized at once. (2) Amputation will give patients with fast, or even imperceptible, pulses a chance—I think their only chance—of survival, provided always that these signs are due primarily to the crushing injury of the limbs themselves and not to manifest hæmorrhage or lesions in other parts.[2]

### IMMEDIATE EFFECT OF EARLY AMPUTATION

The immediate effects of the operation seldom cause alarm. As a rule there was only a small increase in the pulse-rate, and a slight fall in blood pressure. In the most serious cases, too, where amputation was performed whilst the pulse was already poor and fast, the condition was no worse after it. Thus the average increase of pulse-rate taken immediately after operation in eighteen cases was 16 beats with a maximum of 60 and a minimum of *minus* 20—the pulse-rate falling 20 beats after operation. Other large rises of 60, 45, and 40 beats were recorded, the last in the fatal case with head injury, while the first two occurred in cases where *the time of operation was prolonged to 40 minutes.* In these two patients the pulse-rates had fallen during the admission-operation interval from 84 to 70, and from 88 to 75. A slow pulse therefore is no excuse for slow surgery in a case of crush. Operation, however, is sometimes prolonged (1) by the presence of multiple injuries, and (2) by mistaking a crush for a mere compound fracture; time is then wasted over local treatment till the surgeon discovers that injured vessels and nerves call for amputation.

The average blood pressures taken immediately before and after operation in fourteen cases were respectively 115/70 and 100/60, an average fall of 15/10.

In view of these facts we can regard early, rapid, and simple amputation in cases of severe crush as relatively shock-free.

## Treatment of Severe Crushes

To obtain this benign effect in amputation for crush it is necessary to insist on three things: (1) restorative treatment before and during operation; (2) proper anæsthesia; and (3) early and rapid intervention.

### VALUE AND LIMITATIONS OF RESTORATIVE TREATMENT

Restorative treatment must never be omitted; on the other hand, if the patient fails to show a quick and favourable response, it must not be allowed to delay amputation. In those cases, too, which are unfavourable, either because of the proximal level of the crush, or because they come too late to hospital, the patient should be taken at once to the operation room, which, we have learnt, need *not* be an orthodox theatre. Such patients often require treatment nearly as urgent as that for hæmorrhage. The following example shows that there is no place for any refinement that will cause delay.

A man was brought into another service with both thighs crushed. The pulse-rate on admission was only 75. The case was marked "for immediate operation," but in the 30 minutes which elapsed while the theatre was prepared the pulse became uncountable, and amputation failed to save him.

After this event orders were given in the surgical unit that cases with severe crush must be taken to the first room available. There they are at once put under an electric cradle and given a large subfascial infusion of saline. Morphine gr. ¼ to ⅓, or codeine gr. ½ to ¾ is administered according to age. Simultaneously—and this we think vital—local anæsthesia with novocain is begun so that the limb shall be ready for the first incision 20 minutes from the moment the patient enters the hospital. During this time instruments can if necessary be flamed.

### ANÆSTHESIA

We have come, in the surgical unit, gradually to rely on novocain infiltration in performing these amputations. Novocain alone was employed first in this series in a Group II. case on Feb. 9th, 1934. We use from 80 to 150 c.cm. of novocain in ¼ per cent. solution, with 7 drops of 1/1000 adrenaline per ounce, or 30 c.cm. The infiltration must be given time to effect full analgesia, for no pain whatever must be caused by the operation. It is instructive to keep a finger on the pulse throughout one of these amputations in a "poor risk" and to note how any painful, unblocked, stimulus will tend to make it imperceptible. With full analgesia, on the other hand, the pulse often remains unaltered, and indeed will sometimes improve.[3]

*Technique.*—A wide, encircling, weal is made in the skin; this requires from 20 to 40 c.cm. of novo-

[2] One anomalous case already referred to had a long accident-operation interval, 7½ hours. During the hour between admission and operation the pulse-rate remained at 110. The case is mentioned to show that exceptions occur. Rare exceptions, however, are unpredictable and give no excuse for delaying amputation.

[3] Since this was written improvement in pulse and blood pressure has been noted immediately after operation under novocain by my successor in the surgical unit, Dr. M. H. el Zeneiny, in a most unpromising case of double leg-amputation which recovered. Dr. Botros Salib, resident surgeon at Kasr-el-Aini Hospital, through the courtesy of Dr. N. Makar, F.R.C.S., in November, 1935, reports a remarkable case (1935, No. 20999) in a patient, aged 15, where an uncountable pulse became 150, and an unregistrable blood pressure, 90/50, after a double thigh-amputation which he performed under gas-oxygen anæsthesia, according to the "urgent" technique described in this paper. The child recovered.

cain solution. The needle is then directed towards the principal nerves, and at least 10 c.cm. is injected into the neighbourhood of each. This quantity (80 c.cm.) is in general sufficient for full analgesia. An adult thigh, however, may require more novocain—up to 120 c.cm.

If the patient is nervous he may have gas-and-oxygen just before sawing the bone. This was given in this series first to a Group III. case on June 25th, 1934. It is surprising how often the operation can be completed under novocain only without distressing the patient.

Intraneural injections are made individually into the nerves before they are divided, and it is important to inject each nerve once more at a higher level, when it is drawn down from the face of the stump, before it is finally severed in the attempt to avoid terminal neuroma.

Difficulties arise when other wounds require cleansing and excision. In such cases we prefer to administer gas-and-oxygen (or, as a second choice, ether) *in addition* to the novocain infiltration described above.

I have pointed out that the resistance of a patient with severe crush may be extremely frail though his pulse be slow and his blood pressure normal; it will soon break down if the operation lasts much beyond half an hour. For this reason when there are multiple injuries more than one operator should work at the same time.

### THE AMPUTATION

The amputation in order to be rapid should be simple, and in some of the earlier cases guillotine amputations were performed. Little more time, however, is required for a circular amputation in the thigh, arm, or forearm, and for a flap amputation of the leg.

It is essential, because of the hurried and therefore incomplete preparation of the skin, to use a separate knife for dividing the deeper tissues. A couple of catgut sutures approximate muscles and fascia. The skin is closed with a few Michel clips to avoid bearing infection in from without by sutures. The wound is drained with half a split rubber tube. A good dressing for the stump is the sterile boric powder recommended by Sir Robert Jones.

## Conclusions

1. Severe crushing injuries of the limbs can be clearly defined and are to be distinguished from minor crushes. Major crushes carry in themselves a grave risk of early death if amputation is not performed.

2. These serious injuries are compatible *for a brief period* with slow pulses and good blood pressures.

3. A slow pulse and good blood pressure indicate the moment of choice for intervention. This moment will soon pass.

4. The lives of patients with fast or even imperceptible pulses can be saved by immediate amputation when these signs are due to the presence of crushed tissues in the limbs and not to grave injuries elsewhere, or to external hæmorrhage.

5. Amputation therefore should be performed at the very earliest opportunity in every case of severe uncomplicated crushing of the limbs.

6. On admission to hospital the patient is brought at once to the first room available for performing amputation.

7. Restorative treatment and novocain analgesia are to be administered *simultaneously*, and the patient's limb or limbs should be analgesic and ready for amputation within 20 minutes of his arrival in hospital.

8. Other injuries requiring general anæsthesia (gas-oxygen) for their treatment should, if possible, be dealt with during the amputation by another operator, and every effort must be made to limit the operative part of the treatment to less than half an hour.

9. Amputation under full novocain analgesia is a benign measure that does not shock the patient.

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# GALLOP RHYTHM AND THE PHYSIOLOGICAL THIRD HEART SOUND*

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### DEFINITION

Under certain conditions three instead of two sounds accompany each heart cycle. The familiar "lūb dŭpp" then becomes either "lūb dŭpp dŭpp" or "lūb lūb dŭpp." From its resemblance to the sound made by a galloping horse, this triple rhythm has been called "gallop." When the additional sound follows closely on the second heart sound (Fig. 1B) the gallop is termed "protodiastolic," but when it immediately precedes the first heart sound (Fig. 1C) it is termed "presystolic."

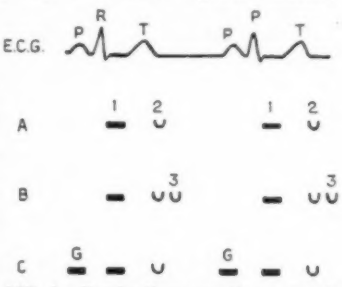


FIG. 1.—Purely diagrammatic representation of heart sounds, to illustrate time relation of accentuated third heart sound (3) and gallop sound (G) to first (1) and second (2) normal heart sounds.

E.C.G. = Electrocardiogram. A = Normal heart sounds. B = Protodiastolic gallop. C = Presystolic gallop.

My object in this communication is to point out the importance of distinguishing between the two types of triple rhythm. They are fundamentally different from one another. The one is physiological; the other pathological. Protodiastolic gallop is quite compatible with perfect health. Presystolic gallop, on the other hand, is a sign of grave prognostic significance. It has been called "the cry of the heart for help." It warns us that the last reserves have been called up, and that the heart is struggling against desperate odds.

### PRESYSTOLIC GALLOP—CLINICAL FEATURES

Let me give some actual figures in support of this statement.

In a consecutive series of 1353 cardiac cases seen in private practice during the three-year period 1930–32, I noted the presence of presystolic gallop in 63 patients. Of these, 1 has been lost sight of, 55 are now dead, and only 7 are still alive. That, I think you will agree, is sufficient evidence of the gravity of this sign in prognosis.

Only 15 of these 63 patients lived for more than

* Based on a paper read at the section of medicine at the annual meeting of the British Medical Association at Melbourne, 1935.

eighteen months after gallop was first noted. Table I. shows the duration of life in these patients.

TABLE I

| | |
|---|---|
| Less than 1 month .. .. .. | 16 |
| 1– 6 months .. .. .. .. | 19 |
| 6–18 ,, .. .. .. .. | 12 |
| More than 18 months (now dead) .. | 8 |
| ,, ,, 18 ,, (still living) .. | 7 |
| | 62 |

When one compares the 15 survivors with the 47 who died during the same period (Table II.), one is

TABLE II

| Age. | Lived for more than 18 months. | Died within 18 months. | Total. |
|---|---|---|---|
| Under 47 .. | — | 16 | 16 |
| 47–49 .. .. | 2 | 4 | 6 |
| 50–59 .. .. | 6 | 13 | 19 |
| 60–68 .. .. | 7 | 9 | 16 |
| Over 68 .. .. | — | 5 | 5 |
| — | 15 | 47 | 62 |

struck by the fact that all the survivors were between the ages of 47 and 68. It is not unexpected that the 5 patients over that age should have died, but it is rather surprising that not 1 of the 16 patients under 47 years of age should have survived.

The explanation of the very high mortality amongst the younger patients is that gallop rhythm may develop in association with several different types of heart disease (Table III.). Acute endocarditis and chronic Bright's disease with high blood pressure accounted for 10 of the 16 deaths amongst the younger patients in my series; whereas, amongst the

TABLE III.—*Died within eighteen months*

| Age. | Over 47. | Under 47. | Total. |
|---|---|---|---|
| Essential hypertension .. | 11 | 2 | 13 |
| Coronary arterio-sclerosis. | 12 | 1 | 13 |
| Chronic nephritis .. .. | 1 | 4 | 5 |
| Acute infections .. .. | 0 | 6 | 6 |
| Miscellaneous .. .. | 7 | 3 | 10 |
| — | 31 | 16 | 47 |

older patients, essential hypertension and coronary arterio-sclerosis were the conditions most commonly found. These are more chronic diseases, and this appears to be the reason why the immediate prognosis in patients with gallop rhythm is rather less grave in the sixth and seventh decades than during the earlier period of life.

Twenty-six patients in this series exhibited signs of heart failure with venous engorgement; 25 of these had regular heart action. This is a very significant clinical observation, for congestive heart failure is notoriously much more common in association with auricular fibrillation than with normal rhythm. The finding of normal rhythm in association with congestive heart failure, in these cases, suggests that contraction of the auricle is essential to the production of gallop, and that presystolic gallop is incompatible with auricular fibrillation. This hypothesis is corroborated by the fact that, if a patient with gallop rhythm develops auricular fibrillation, the gallop always disappears, but will recur if normal rhythm is restored.

### MECHANISM OF PRESYSTOLIC GALLOP

Further corroborative evidence concerning the rôle of the auricles in the production of gallop is derived from experimental observations. All workers who have studied this problem by means of graphic records have found that the third sound in gallop is always synchronous with auricular systole.

Fig. 2, which is taken from one of many similar records made from my own cases, serves to illustrate this point. The upper tracing is an electrocardiogram and the lower a record of the heart sounds. The vibrations of the first heart sound (1) correspond in time to the R wave of the electrocardiogram, those of the second sound (2) to the T wave, and those of the gallop sound (G) to the succeeding P wave.

In order to explain the part played by auricular contraction in the production of gallop rhythm, I must briefly refer to certain events which take

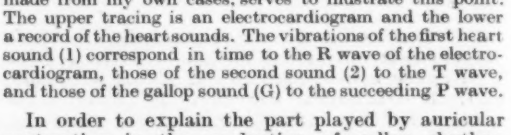


FIG. 2.—Electrocardiogram (unstandardised) and phonocardiogram from a patient with gallop rhythm, to illustrate the time relations of the first (1), second (2), and gallop (G) sounds to the R, T, and P waves of the electrocardiogram.

place during the cardiac cycle. For this purpose it is convenient to divide that portion of diastole which follows the opening of the mitral and tricuspid valves into three stages—early, middle, or late diastole. When the mitral valve first opens † the pressure in the auricle is much higher than that in the ventricle, and during early diastole blood is rushing, with considerable velocity, through the mitral orifice. During mid-diastole, the rate of blood-flow from auricle to ventricle is greatly reduced, and the pressure in both chambers rises very slowly as blood flows in from the great veins. The third and final stage of diastole is occupied by contraction of the auricle. When this occurs, there is a sudden rise in the auricular pressure, and the rate of blood-flow through the mitral orifice is again increased. It is important, however, to remember that by the time the auricle contracts the ventricle is generally so full that it is capable of accepting very little more blood. I would ask you to note especially, that the most rapid filling of the ventricle occurs during early diastole.

That is what happens when the heart is beating slowly. Let us now see how this is modified when the heart beats more rapidly. The three records in Fig. 3 were made on myself during the period of recovery from an inhalation of amyl nitrite.

The upper tracing in each record is an electrocardiogram, the lower one a sphygmogram. In the first record, the heart was beating at a rate of 130 per minute. In the second record, taken 30 seconds later, the heart-rate had slowed down to 110; and in the third record, taken four minutes later, it had returned to normal, and was beating at 73. In the corresponding diagrams, I have represented by black rectangles auricular and ventricular systole, as measured from the electrocardiograms. You will see that, when the heart-rate is 73, auricular and ventricular

† The same applies to the right side of the heart.

systole are separated by a time interval of more than three-tenths of a second, whereas, when the heart-rate is 110, the interval is reduced to about one-tenth of a second; and, when the heart-rate is 130, there is no interval at all, auricular systole following immediately on ventricular systole.

In other words, in the first record, the entire diastolic portion of the ventricular cycle is occupied by auricular systole, and, even in the second record, auricular systole occurs very early in diastole. Now what is the significance of this? It means that when the heart is beating quickly, the rate of blood-flow from auricle to ventricle, which normally is most rapid during early diastole, is still further accelerated by contraction of the auricle. This I believe to be a factor of primary importance in the production of gallop rhythm. The abnormally rapid rate of ventricular filling causes sudden distension of the ventricle. This sets its walls into vibration, and so produces a presystolic sound. It does more than that. It produces a palpable presystolic impulse, to which I shall refer again.

But that is obviously not the whole story. If it were, every patient with tachycardia would exhibit gallop rhythm. A second factor is essential—namely, a lack of tone in the ventricular muscle. Whereas the healthy ventricle is able rapidly to accommodate itself to sudden changes in the volume of its contents, the muscle of the ventricle which is lacking in tone is unable to do so. If suddenly stretched, it will oscillate to and fro.

This association of heart failure with tachycardia accounts for the grave clinical significance of gallop. The appearance of gallop means that the stroke volume of the failing ventricle is reduced to such an extent that the heart is no longer able to maintain an adequate output per minute, except by increasing its rate.

To sum up, I believe that the additional impulse

FIG. 3.—Electrocardiograms and optical carotid pulse tracings taken during recovery from an inhalation of amyl nitrite, to illustrate the curtailment of diastole during the tachycardia; (*a*) 80 seconds after commencement of inhalation, (*b*) 110 seconds after commencement of inhalation, (*c*) 360 seconds after commencement of inhalation.

in presystolic gallop is produced by sudden distension of the hypotonic ventricle and the additional sound by vibrations of the ventricular wall, both these phenomena being the result of the abnormally rapid rate of filling of the ventricle, when contraction of the auricle occurs early in diastole.

*Other hypotheses.*—It has been suggested that gallop rhythm may be due either to partial heart-block or to bundle branch block. My observations lend no support to this hypothesis. In my series, partial heart-block was present in only 1 of the 33 cases in which an electrocardiogram was obtained. Bundle branch block, on the other hand, was relatively common. It was present in 7 of these 33 cases. This association, therefore, appeared to merit further inquiry. As a control, I examined all the electrocardiograms taken in the 1353 patients amongst whom my 63 cases of gallop occurred, and I found that there were 9 cases of bundle branch block without gallop rhythm. Thus neither did the majority of patients with gallop rhythm exhibit bundle branch

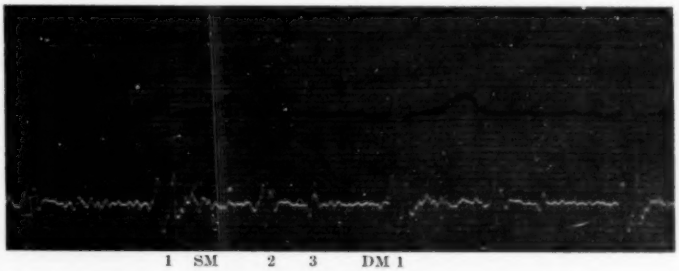


FIG. 4.—Electrocardiogram and phonocardiogram, from a patient with advanced mitral stenosis. (1) First heart sound (SM) systolic murmur, (2) second heart sound, (3) third heart sound, (DM) diastolic murmur.

block, nor did the majority of those with bundle branch block exhibit gallop rhythm. That bundle branch block and gallop rhythm should often occur together is not surprising, for both are signs of grave myocardial damage. There is, however, no evidence of a causal relationship between these two signs.

### ACCENTUATION OF PHYSIOLOGICAL THIRD HEART SOUND

Let me now turn to the consideration of the "protodiastolic" type of gallop—the type in which the additional sound follows closely on the second heart sound (lŭb, dŭpp, dŭpp). The term "protodiastolic gallop" is a bad one, because the epithet "protodiastolic" is used by physiologists to describe that phase of the cardiac cycle which immediately precedes the closure of the semilunar valves, whereas the additional sound in protodiastolic gallop occurs not before, but about one-tenth second after, the closure of these valves. There is a second objection to the term protodiastolic as applied to gallop. When the heart-rate is rapid, contraction of the auricle takes place early in diastole (see Fig. 3). Presystolic gallop then becomes "protodiastolic" in time. Actually the additional sound in protodiastolic gallop is nothing more nor less than an accentuated physiological third heart sound. Much confusion would be avoided if it were so called, and if the term "gallop" were reserved for the presystolic variety.

Now what is this "physiological third heart sound"? In many perfectly healthy young people, three instead of two heart sounds can be heard. The third heart sound is rather faint, and occurs about 1/10th sec. after the second heart sound. It can be brought out by any procedure which increases the rate of venous return to the heart, such for example as exercise or elevation of the limbs.

Thayer ‡ of Baltimore studied this problem both clinically in man and experimentally in animals. In a series of 231 healthy young persons whom he examined, Thayer found that a third heart sound

‡ Thayer, W. S.: Trans. Assoc. Amer. Phys., 1908, xxiii., 326; 1909, xxiv., 71.

was present in 65 per cent. He also demonstrated the presence of a similar sound in dogs. This sound corresponded in time to the sudden distension of the ventricles which occurs early in diastole. He suggested that it was produced by vibration of the valve cusps, set up by the first rush of blood from auricle to ventricle.

This type of triple rhythm is always best heard in the vicinity of the cardiac apex. It can therefore easily be distinguished from that due to a "split" second sound produced by asynchronous closure of the aortic and pulmonary valves, which is audible only over the base of the heart. The third heart sound is a perfectly normal phenomenon. It has no pathological significance.

To sum up, I believe that the physiological third heart sound is produced by vibration of the A.V. valves, whereas the gallop sound is due to the vibration of the wall of the atonic ventricle. Further, the physiological third heart sound results from an acceleration of the blood-flow from auricle to ventricle, when the rate of venous return to the heart is increased, whereas the gallop sound is due to sudden distension of the ventricle, when the auricle contracts early in diastole.

Now how can we distinguish clinically between presystolic gallop rhythm and an accentuated third heart sound? In the first place, the gallop sound is generally accompanied by a palpable diastolic impulse, whereas the third heart sound is not. The normal cardiac impulse is a single thrust. The gallop impulse is a double wave. This gives to the hand the impression of a damped oscillation of the chest wall. Secondly the sounds in gallop (lūb, lūb, dŭpp) are almost evenly spaced; whereas the accentuated third heart sound (lūb, dŭpp, dŭpp) is obviously more closely related to the preceding second than to the succeeding first heart sound. Lastly, the accentuated third heart sound is frequently present in patients with auricular fibrillation, whereas fibrillation and gallop never occur together.

*Mitral stenosis.*—Fig. 4 is taken from a patient with mitral stenosis. It shows the accentuated first heart sound and the duplicated second sound characteristic of that condition. It will be observed that the first component of the second sound is synchronous with the end of ventricular systole as indicated by the T wave in the electrocardiogram, and that the second component occurs about 1/10th second later. This second component is merely an accentuated third heart sound; it bears no relation to the P wave in the electrocardiogram, as was the case with the gallop sound. On the other hand, it does bear a constant relation to the preceding second heart sound, since it is synchronous with the opening of the mitral valve which follows the closure of the semilunar valves by about 1/10th second.

Although mitral stenosis is the condition par excellence in which to listen for an accentuated third heart sound (or, as it is commonly called, a "reduplicated second sound"), I have never met with presystolic gallop in a patient with this lesion. The explanation of this incompatibility is twofold. In the first place, gallop rhythm occurs only when heart failure is present or imminent. Now heart failure, in patients with mitral stenosis, is almost always the result of auricular fibrillation. This complication, as we have seen, excludes the possibility of gallop. Even in those very rare cases of mitral stenosis with heart failure and normal rhythm, the conditions present are such as to prevent the development of gallop. As I have pointed out, rapid filling of the ventricle is essential to the production of gallop, but rapid filling of the ventricle cannot occur when the mitral orifice is stenosed.

### CONCLUSION

In conclusion let me once again emphasise the grave significance of presystolic gallop, and the importance of distinguishing it from that type of triple rhythm which is due to accentuation of the physiological third heart sound.

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## SONNE DYSENTERY IN A MENTAL HOSPITAL

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Outbreaks of dysentery due to infection with *Bacillus dysenteriæ* Sonne have been described with increasing frequency in many parts of the world since Sonne in 1915 demonstrated that this organism is a cause of the disease. Many of these outbreaks have mainly affected children,[1 2] but one of them,[3] in a hospital staff, was confined to adults and clinically showed considerable similarity to the outbreak at Horton Mental Hospital. A prominent feature of the Horton epidemic was its high infectivity among the patients, although no member of the staff was taken ill. The first cases occurred in three adjacent wards on the male side, but almost at once further cases of the same type manifested themselves in widely separated parts of the hospital, and efforts to control the spread of infection were unavailing. Strict isolation of cases was practised from the beginning and possible causes of propagation—such as contaminated food or water-supply and inadequate treatment of foul linen—were investigated with negative results. The origin of the infection could not be discovered. It may have been previously present in a mild or symptomless form, as in some of the cases in the outbreak described by Felsen and Osofsky.[4] The epidemic lasted some six weeks—from the latter end of March, 1935, until the middle of May—and was followed by a further slight outbreak at the end of June and the beginning of July. In all 113 cases were recorded during the main epidemic, and bacteriological investigations were made on 75 of these.

It is probable that in an outbreak of such proportions, occurring among the insane, a number of mild or possibly symptomless cases were missed, and this may explain the wide spread of the infection. Reference to carriers among patients in mental hospitals is made by Gardner[5] who, in discussing so-called "asylum dysentery" quotes the opinion expressed by H. S. Gettings "that carriers are the main source of infection." A questionnaire on carriers circulated by a research subcommittee of the Royal Medico-Psychological Association[6] showed that ten hospitals recorded carriers of both typhoid and dysentery—three of dysentery only—in all 28 cases. Although the infection appears to have been of the Flexner type, the same may well be true of Sonne dysentery.

Clinically the disease, though acute at the onset, was relatively benign and there were no deaths from the dysentery itself, although it appeared to hasten the death of a number of previously debilitated patients. The principal points in the clinical picture were a sudden onset, mostly with a sharp rise of temperature, varying from 99° F. to 104° F. (60 per cent. of the cases); vomiting (23 per cent.) often with considerable prostration; and abdominal pain and

discomfort (20 per cent.). About 90 per cent. of the patients had diarrhœa commencing at the onset; the motions were numerous and small, containing mucus, and in 23 per cent. of cases traces of blood. As a rule the temperature dropped in 24–48 hours, and the acute symptoms subsided in 1–7 days. The acute stage was often followed by obstinate constipation as noted by Fraser and Smith [1] at Aberdeen. In a few cases the illness was somewhat longer, but in these it was not necessarily more severe; indeed, many of those of short duration had a sharper reaction. Recovery was usually rapid and complete.

This description of the clinical findings is essentially similar to that given by other authors. In their "severe adult type" Felsen and Osofsky [4] describe a sudden onset, high temperature, vomiting, prostration, and bloody diarrhœa. In their general description of clinical manifestations Fraser and Smith [1] note a temperature of 99°–103° F. (53 per cent. of cases) for 24–48 hours, vomiting (94 per cent.), diarrhœa (91 per cent.), blood in stools (13·5 per cent.), and abdominal pain (32·1 per cent.). Cann and Navasquez [3] describe giddiness and malaise, abdominal discomfort and diarrhœa, and pyrexia (never over 101° F.) with return to normal in 48 hours—a slightly milder type of the disease.

### BACTERIOLOGICAL INVESTIGATION

Specimens of fæces were obtained from each patient and inoculations were made on plates of McConkey's medium. Most of the plates grew *Bacillus coli* in abundance, but certain of them showed small pale colonies of a non-lactose-fermenting type. These were picked off, sub-cultured into broth, and also used for inoculating sugars. Specimens from 16 cases were thus examined, and of these 7 gave positive fermentation and agglutination reactions. In the fermentation tests lactose did not show the typical reaction (acid without gas) until the seventh day, and saccharose not until the tenth to twelfth day. Agglutination was also somewhat delayed, and it was found necessary to subculture in broth several times before a positive result could be obtained, with titres varying from 1 in 500 to 1 in 1250.

In view of the fact that fermentation was a lengthy procedure and that one was apparently dealing with an outbreak of Sonne dysentery, further investigations were limited to plating on McConkey's medium, and agglutinations of broth cultures, as advocated by Gardner.[5]

In all some 75 cases (66 per cent. of total) were investigated by cultural methods, of these 22 (30 per cent.) showed the Sonne organism. The positive results might have been higher if it had been possible to make more than one culture in each case. About seven weeks after the commencement of the outbreak the decline in the number of fresh cases made it possible to undertake a second investigation, and a single specimen was again examined from 70 of the original cases. Only 3 of these gave a positive result—four weeks, three weeks, and one week after the onsets.

It is generally agreed that as a rule the organisms disappear rapidly from the stools. Cann and Navasquez [3] say "a few days"; Fraser and Smith [1] state that of 53 cases 41 were negative in a week. Of the remainder, 4 were negative by the second week, another 4 by the third week, and 3 more by the fourth. Only 1 was positive for seven months.

In the early stages of the investigation serum agglutination tests were made on a few cases. Ten sera were thus tested within a fortnight of the onset, and nine of these gave a positive reaction with titres varying from 1 in 25 to 1 in 600. A more complete investigation was made later, at the same time as the second examination of fæces—seven weeks after the commencement of the outbreak. Of the original 113 cases 83 were examined, and of these 51 (60 per cent.) were positive, 41 of them at a titre of 1 in 125 (the highest dilution used). In all agglutination tests standard suspensions and sera only were used.

### THE SECOND OUTBREAK

As previously mentioned the second outbreak was small, being confined to a single ward. Cases had occurred there previously, but had always been transferred to isolation, and there had been no fresh cases, either in this ward or elsewhere, for about six weeks. Ten patients were affected during a period of three weeks. They all showed the usual clinical symptoms and were at once removed to isolation. Sonne's bacillus was isolated in only two cases, but clinically there was no doubt of the diagnosis in all the ten patients. The stools of the 48 patients remaining in the ward were also investigated—a single culture only being made in each case, with the interesting result that three hitherto unsuspected cases were found to be harbouring Sonne's bacillus.

Although these patients never showed clinical symptoms, precautionary measures were taken and the stools of each of them were examined again on eight separate occasions during the following six weeks. Two were found to be still positive at the end of a month; thereafter all three were negative. In view of this evidence of infection in patients showing no clinical symptoms, it was decided to carry out serum agglutinations on as many as possible of the 48 cases in the ward, all of whom might presumably have been exposed to the risk of infection. A total of 34 sera were tested and 25 of these (including the three culturally positive cases) proved positive in dilutions varying from 1 in 25 to 1 in 1250. As, however, a small dose (125 million organisms) of a prophylactic vaccine had previously been given to 13 of these 25 cases (again including the three with positive cultures) the value of these results is somewhat doubtful. It is of more significance that of the 21 cases *not* vaccinated a positive result was obtained in 12—nearly 60 per cent.

### CONCLUSIONS

Sonne dysentery is a disease of high infectivity, usually acute in onset and of moderately benign course. Most cases soon become free from infection, but a small number continue to harbour the bacilli, while others pass organisms in the stools without having shown any clinical symptoms. Both these forms of carrier may play a large part in spreading the disease.

Agglutination of standard suspensions of Sonne's bacillus by patients' sera can be obtained in a large proportion of cases showing clinical symptoms, even if culture has proved negative, and also in some cases in which there is no clinical evidence of the disease. In the former type agglutination is valuable in confirming a diagnosis, while in the latter it is possibly useful in detecting carriers or latent cases.

I wish to thank Dr. W. D. Nicol, medical superintendent of Horton Mental Hospital, for his kind encouragement and for permission to publish these cases, and also Dr. S. A. Mann, of the L.C.C. Central Pathological Laboratory, Maudsley Hospital, for his help and advice.

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# SARCOMA OF THE DUODENUM

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Sarcoma of the duodenum is rare, and comparatively few cases have been reported. As Rolleston [1] has pointed out, sarcomata involve the duodenal tract more extensively than carcinomata; and in sarcoma dilatation due to softening by the growth occurs, whereas in carcinoma obstruction is commoner. Very few cases of primary sarcoma have been described and therefore it is difficult to form conclusions. We have discovered the following recent records:—

Strauss et al. [2] describe a lymphosarcoma of the duodenum located distally to the ampulla of Vater. The patient survived two years after a gastro-enterostomy and a course of deep X ray therapy.

In the radiographic diagnosis of duodenal tumours Brdiczka [3] points out that of 84 cases of intestinal myoma, only 6 were found in the duodenum. He quotes a case of myosarcoma of the duodenum in a female of 60, who died suddenly from lung embolism a week after operation. The tumour was situated in the right epigastrium, was attached to the bulb of the duodenum, and was the size of a fœtal head. There were no metastases, and the gall-bladder was not involved.

Pfundt [4] reported a case of spindle-cell sarcoma of the duodenum occurring in a female aged 41. She had had pain in the right epigastrium for a few weeks, and the pain was almost continuous. She had lost 20 lb. in weight—there was no vomiting or nausea. Her general nutrition was good and there was no distension of the abdomen. A tumour the size of an orange was found in the right epigastrium and appeared to be attached to the liver. A blood count showed 10,800 leucocytes. At operation the tumour was found to be a large thick-walled tumour, filled with cysts, attached to both the gall-bladder and the pars superior duodeni. Processes of the tumour, 2–3 cm. long, were found infiltrating the lumen of the duodenum. The duodenal mucous membrane was normal, and after closing of the abdomen the patient made an uneventful recovery.

LaRoque and Lee Shiflett [5] reported the case of a female, aged 48, who complained of a mass in the upper thigh. Various small nodules had been removed during the previous thirteen years. There was a history of previous gastric trouble consisting of gastric fullness, vomiting and pain, but no hæmatemesis. The patient was found to be emaciated and anæmic. The liver was large, and there was a palpable mass in the right upper quadrant. Radiography showed that the duodenal bulb was much dilated, and an abdominal operation revealed a hard tumour the size of a hen's egg inside the lumen of the duodenum. The pyloric portion of the stomach and the first three inches of the duodenum were removed. After temporary rallying the patient died suddenly from dilatation of the stomach. The tumour proved to be a spindle-cell sarcoma.

Libman [6] has collected 54 cases of lymphosarcoma of the bowel—15 of which were in the duodenum. None of the patients were below ten years of age, and 9 between ten and twenty years. He states that sarcoma is very rare, and has not recorded any recoveries. Possibly its course may be delayed by X ray and radium therapy.

Anderson and Door [7] recorded a case of a male, aged 37, who had had tarry stools for the previous seven weeks. This was associated with loss of weight, œdema of the lungs and feet, and a lump in the right side of the abdomen. No abdominal pains or fever. There was a tender swelling in the right upper abdomen which projected two inches below the margin of the liver; it was hard and irregular. This patient was not operated upon, and died six days after admission from shock following extensive hæmorrhage into the gastro-intestinal tract. At the autopsy the tumour was found to involve the posterior aspect of the second portion of the duodenum and the posterior and inferior aspects of the third portion of the duodenum. The anterior surface of the duodenum was free. Histologically it was found to be a primary leimyosarcoma; it had caused compression of the inferior vena cava and thrombosis of the iliac veins. The authors of this paper state that the only other case of leimyosarcoma was reported by Salis in 1920.[8] This case was that of a man, aged 40, who was found post mortem to have a large tumour attached to the duodenum above the duodeno-jejunal juncture. He had previously had an operation for gastric symptoms from which he recovered, leaving a tumour and fistula, and it was four months after the second operation for the removal of this tumour and fistula that he died.

Berstein records [9] a case of myoma of the duodenal bulb, while Gehrig [10] gives an account of polyposis of the duodenal bulb.

Our patient was a male, aged 38, and was first seen by one of us (M. H. F.) on Feb. 27th, 1934. He said that while dressing he had been seized with severe abdominal pain and had collapsed. There was no vomiting, but within a couple of hours he passed some large tarry stools. He had no previous history of ill-health and had never before suffered from any abdominal discomfort.

*On examination* he showed extreme shock; he was very pale and his pulse was hardly perceptible. Nothing definite was found on examination of his abdomen; there was no tenderness and no rigidity. On palpation per rectum nothing could be found, but proctoscopic examination revealed melæna. The heart sounds were normal and the blood pressure 100/70. He was first of all treated for shock with atropine and camphor, and heat was applied externally. Heart stimulants were given by mouth, and during the next three days his condition improved somewhat and the melæna diminished.

On March 2nd he was sent to the West London Hospital with a diagnosis of "bleeding duodenal ulcer." On admission he was given a blood transfusion—(14 oz., group 4). The next day he had much melæna. He was treated by rectal salines, followed by Lenhartz's diet. During convalescence the patient complained of blurred vision in the right eye. Mr. H. P. Gibb reported: "both discs have blurred margins—there is a large oval hæmorrhage over the right macula, and a smaller hæmorrhage on the nasal side of the right disc. In both fundi there are spots of choroidal disturbances, which may be the result of hæmorrhages which have cleared up." A barium meal showed a hypertonic stomach. The duodenal cap would not fill, and there appeared to be a small crater where the duodenal cap is usually situated. The evidence was suggestive of duodenal ulcer.

FIG. 1.—The duodenum opened to show the tumour in its posterior wall, adherent to the pancreas.

*Blood counts.*—In March a blood count showed: red cells, 1,400,000; hæmoglobin, 23 per cent.; colour-index, 0·82; white cells, 8000; marked polychromasia, with poikilocytosis and anisocytosis; nucleated red cells rare. The patient was given ferri et ammon. cit., grs. 40 t.d.s., and a blood count on May 4th showed: red cells,

4,000,000; hæmoglobin, 76 per cent.; colour-index, 0·95; white cells, 8000.

*Course of illness.*—Discharged in July, 1934, he was seen again later that month when his teeth were removed as a possible focus of infection. Between July and October he had no trouble whatever; he gained about ½ st. in weight, and stated that he had never felt better in his life. But on Oct. 23rd, and until the end of the year, he complained of vague abdominal pain, which he described as "indigestion." This pain was relieved by alkalis. From the findings at the previous X ray examination the

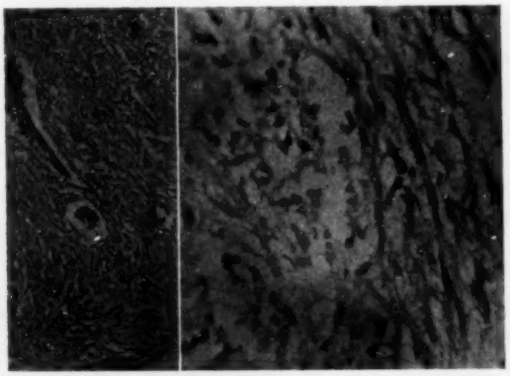

**FIG. 2.**—Microscopical sections of tumour: low power and high power.

possibility of a small duodenal ulcer was still kept in mind, and early in November he was given Larostidin injections, 5c.cm. daily, for three weeks. Between January and March, 1935, his symptoms gradually abated. On March 8th he was seen again in a state of collapse, and his condition exactly resembled his first attack. He was again removed to the West London Hospital. On this occasion his hæmoglobin was 24 per cent., but it rose to 42 per cent. with a month's intensive iron treatment. A barium meal showed irregularity and irritability of the duodenal cap. The patient remained in hospital until May, when he was discharged owing to his developing a mild attack of scarlet fever. On discharge he was advised to return later for laparotomy. From May until August he was free of symptoms, but on August 14th he collapsed while walking in the street and was brought home. His condition was again similar to his previous one, and he was admitted to the Royal Hospital, Richmond. Here he was found to be extremely collapsed and suffering from shock and internal hæmorrhage. Nothing could be found on palpation of the abdomen. A blood transfusion was advised, and while preparations were being made the patient died.

*Post-mortem examination* revealed the body of a fairly well-nourished man. The heart and lungs were normal. The liver contained no secondary deposits. As will be seen from Fig. 1, there was a tumour the size of a small hen's egg at the junction of the first and second parts of the duodenum, adherent to the pancreas. The tumour was in the posterior wall of the duodenum and had ulcerated through the lumen. The mucosa was congested and red, and the bowel full of blood. No metastases or glands could be found. Microscopically, Dr. David Murray reported the tumour to be a spindle-celled sarcoma (Fig. 2).

This case is interesting in view of the temporary recoveries and the excellent condition of the patient between the attacks. Clinically the outstanding feature was hæmorrhage, and there was no vomiting or evidence of obstruction. No positive evidence of a duodenal lesion was obtained and the patient was well nourished at the time of decease.

We are indebted to Dr. Geoffrey Kor[illegible]am for the notes of the case while at the West [illegible] Hospital.

(*References at foot of next column*)

# SPONTANEOUS FRACTURE IN ACUTE AND SUBACUTE OSTEOMYELITIS

REPORT OF TWO CASES

BY R. C. TATHAM, F.R.C.S. Eng.

LATE SURGICAL REGISTRAR, MIDDLESEX HOSPITAL, LONDON

FRACTURE is a recognised though uncommon complication of chronic osteomyelitis, usually due to excessive removal of bone for cure of a chronic abscess or in sequestrectomy. But fracture in acute or subacute cases is exceedingly rare. Thus Capener and Pierce[1] in a series of 1086 cases of osteomyelitis found it in 18 (1·7 per cent.) and of these only 2 cases were classified as subacute and 1 as acute. The following cases therefore seem worthy of record.

CASE 1.—A boy, aged 14, was admitted to the Middlesex Hospital under the care of Mr. Pearce Gould on Oct. 30th, 1931, with a history of having eight weeks previously developed a painful swelling of the lower end of the left thigh and knee, thought at first to be tuberculous. After a few days a popliteal abscess had been opened and drained, and the pus from it showed staphylococci. There was no definite history of injury. On admission there was a wound on the inner side of the left thigh just above the knee discharging much pus; the knee was slightly flexed and there was varus deformity with great pain on attempted movement. The general condition was good and the temperature and pulse normal. Radiography (Fig. 1) showed a fracture through the metaphyseal region with impaction and angulation, and a general patchy rarefaction of the whole of the lower end of the shaft. Some periosteal new bone was visible proximal to the line of fracture. The deformity was corrected under general anæsthesia and the limb put in plaster with a window. The patient was returned to his local hospital on Nov. 26th, 1931. A letter from his doctor dated Oct. 3rd, 1935, stated that he was at work in a garage; no operation had been performed since leaving Middlesex Hospital, but a sinus was still present though repeated X ray examinations failed to show any sequestrum.

CASE 2.—A boy, aged 9, was admitted to Dudley-road Hospital, Birmingham, on June 6th, 1935, under the care of Mr. Parsons, with an acute painful swelling of the lower end of the left thigh of four days' duration. There was a history of mild injury while at school the day before the onset, but it was not sufficiently severe to prevent him running about at play afterwards. On admission (five days later) the pulse-rate was 106 and temperature 102·2° F. A popliteal abscess was opened and drained and the limb put up on a back splint with foot-piece and side splints. The lower half of the thigh remained extremely tender for the first week, but the local and general condition gradually improved, the temperature becoming normal on the eighteenth day after admission. X ray examination (Fig. 2) on the eleventh day showed a fracture with slight displacement through the metaphysis of the lower end of the femur, general patchy rarefaction of this region, and some periosteal new bone, most conspicuous on the inner

[1] Capener, N., and Pierce, K. C.: Jour. Bone and Joint Surg., 1932, xiv., 501.

(*Continued from previous column*)

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and popliteal surfaces. The wound continued to discharge, and on Sept. 27th a further radiogram (Fig. 3) showed a sequestrum, which on removal proved to be a portion of the cortex, the lower end being just above the line of fracture which was no longer visible. There was a massive involucrum.

In neither of these cases was there a history suggesting that fracture preceded the infection. In the first case fracture was noted eight weeks after the onset of the disease and in the second case on the fifteenth day of the illness—i.e., earlier than in any other recorded case. In both cases back splints had been applied after the initial drainage, which did not involve the removal of any bone. The exciting trauma must therefore have occurred while the limb was on the splint or after the splint had been removed for a dressing. There was no note of any knock or sudden bend, so that it must have been very trivial. In Capener and Pierce's earliest case fracture occurred at the junction of the middle and lower thirds of the femur eight weeks after drainage, and was due to a blow on the uncovered but supported thigh; the medulla had been drained. In the cases here recorded no bone had been removed for drainage.

When osteomyelitis follows its usual course there is simultaneous weakening of bone from vascular and osteoclytic absorption, and strengthening of it from periosteal new bone-formation; so that by the time the original bone has been absorbed sufficiently to allow of fracture enough new bone has been formed to prevent such an accident. If the rate of absorption outstrips that of new bone-formation, and if the absorption proceeds throughout the thickness of the shaft, then fracture becomes possible. The conditions necessary for rapid absorption are a high proportion of vascular tissue to bone and patent vessels. Such conditions are found in the metaphysis and in the more subacute type of case. Should all the vessels become thrombosed by the acuteness of the process, then absorption is, of necessity, osteoclytic and slow, the bone being a dead structure. Further reference to the above cases will show that they were both of the less acute type, the first being at first regarded as tuberculous, and that the fracture occurred through a widespread area of rarefaction in the metaphyseal region. There is also a noticeable lack of new bone-formation in the region of the fractures (Figs. 1 and 2). Furthermore the after-histories show that sequestrum-formation was minimal and in Case 2 not immediately related to the fracture. Thus the clinical and X ray findings and after-histories support the explanation of causation which has been given.

FIG. 1 (Case 1).—Radiogram of lower end of femur showing fracture through a diffusely rarefied area in the region of the metaphysis. Periosteal reaction slight and not related to fracture.

FIG. 2 (Case 2).—Radiogram of lower end of femur showing fracture with very little displacement through metaphyseal region. Slight but definite rarefaction. Some periosteal new bone posteriorly.

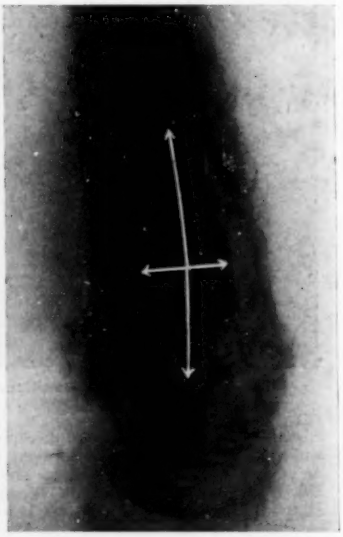


FIG. 3 (Case 2).—Radiogram of lower end of femur showing sequestrum (indicated by white lines) lying in a massive involucrum. Line of fracture not visible.

My thanks are due to Mr. Pearce Gould, surgeon to Middlesex Hospital, and to Dr. F. W. Ellis, medical superintendent, and Mr. K. O. Parsons, surgeon to Dudley-road Hospital, for permission to publish the cases.

## TWO CASES OF TWIN-LOCKING

By J. Stanley Coleman, M.B. Lond.

LATE DEPUTY MEDICAL SUPERINTENDENT, FOREST GATE HOSPITAL, LONDON, E.

Apart from certain features of interest, the rarity of this obstetric complication would be sufficient reason for placing these cases on record. According to von Braun[1] the condition occurred only once in 90,000 deliveries in Vienna.

Case 1.—Mrs. A., aged 29, a 2-gravida, was admitted to the Forest Gate Hospital at 6.30 A.M. on Nov. 21st, 1934. Labour had commenced about an hour earlier with a sharp vaginal hæmorrhage, on account of which she was sent into hospital. The last menstrual period began on March 1st, so that the pregnancy had advanced to about the thirty-eighth week.

Vaginal examination revealed an os that admitted two fingers, the cervical canal had not been taken up, and no placenta could be palpated around the margin of the os. A presenting vertex lightly engaged at the brim could

[1] Eden and Holland's Manual of Midwifery, London, 1925, p. 358.

be palpated with the fingers through the unruptured membranes. The pelvis was judged to be roomy, and on inquiry the patient told me her first infant weighed 12 lb. at birth, and the labour was quite normal. Abdominal examination was difficult owing to frequent strong contractions; over-distension of the uterus was noted but hydramnios was not present. Only one fœtal heart could be heard all over the lower abdomen and only one breech palpated with certainty at the fundus. Between pains, however, I thought I could palpate a second head slightly to the left of the midline at the lower pole of the uterus. A tentative diagnosis of twins was made, both fœtuses presenting by the vertex. A catheter specimen of urine showed a cloud of albumin.

Labour was allowed to proceed and twelve hours later vaginal examination revealed the os three-quarters dilated, the cervix thick all round with some œdema of the anterior lip. A fœtal head was half engaged at the brim, extended, and lying in the left occipito-posterior position. Morphia and later chloral were administered and the patient obtained a little respite from the pains that continued strong and frequent. Fifteen hours later examination revealed no further advance and the woman was becoming exhausted. The abdomen was now very tender and any movement or palpation distressed the patient considerably.

At 9.30 A.M. on Nov. 22nd, 28½ hours after the onset of labour, chloroform was administered and a careful pelvic examination made. I found two heads firmly impacted at the brim. The foremost head was lying face to pubes in the extended position and a loop of cord was felt around the neck. The second head was firmly wedged under the chin, against the neck and upper part of the thorax of the first fœtus. The back of the second fœtus was in the midline anteriorly.

The cervix was first gently dilated to its maximum, the second head pushed up out of the brim, and the first head completely rotated and flexed as much as possible. I always use my left hand for the manœuvre of manual rotation, so that I was able to apply the forceps without removing my hand from the uterus. The first head was gently drawn down to the vulva and delivered after removing the forceps, and it was soon found to be quite impossible to deliver the trunk, owing to the extreme tension on the cord and the loop drawn tightly around the neck which could not be slipped over the head. The cord was divided between forceps and the first fœtus, a live female weighing 5 lb. 12½ oz., rapidly delivered. Sharp intrapartum hæmorrhage now occurred so I applied the forceps to the second head and delivered another live female weighing 5 lb. 13½ oz. ten minutes later. There was some post-partum hæmorrhage which was checked by rapidly expressing both placentæ from the uterus.

The case was one of binovular twins with two separate placentæ (one of the battledore variety) and no membranous fusion. The puerperium was uneventful and the patient left hospital with the vigorous twins twelve days later.

I would draw attention to the following points: (1) The difficulty of establishing firmly the diagnosis of twins without X ray examination. In my experience the diagnosis is often missed. (2) The frequency with which loops of cord around the fœtal neck cause primary extension of the head leading to complications such as persistent occipito-posterior positions, "face" and "brow" labours and prolapse of an arm. In this case extension of the leading head allowed the second head to become impacted under the chin. (3) Intrapartum hæmorrhage after delivery of the first twin should be an indication for immediate delivery of the second fœtus.

CASE 2.—Mrs. B., aged 27, a primipara, was admitted to the hospital on Nov. 16th, 1934, as a case of albuminuria of pregnancy. There was œdema of the legs and vulva and some puffiness of the face. The blood pressure was raised to 160/100 mm. of mercury, and the urine loaded with albumin. Some degree of hydramnios was noted and apart from the discomfort of the distended abdomen there were no symptoms. A diagnosis of twins had already been made and verified by X ray examination. The last menstrual period began on March 3rd, so that on admission the pregnancy had advanced to about 37 weeks and the expected day of confinement calculated in the first half of December. The pelvis was judged to be roomy; external pelvimetry revealed normal measurements, and on vaginal examination nothing abnormal was noted.

With rest in bed, special diet, and mild eliminative treatment on classical lines, the general condition improved, the œdema completely disappeared, and the albuminuria diminished. The membranes ruptured suddenly on Dec. 5th at 10.30 P.M. and the patient went into labour. She was examined at 11.30 P.M., the os admitted two fingers, the cervix was not taken up, and a head was lightly engaged at the brim. The second vertex could easily be palpated per abdomen in the midline anteriorly. By 6 A.M. the first head was well engaged, the dilatation very slow (three fingers), and it was noted the vertex was extended and lying almost face to pubes. At 1.30 P.M. on Dec. 6th, 15 hours later, the os was fully dilated, the extended head was found impacted low in mid-cavity, lying face to pubes with marked moulding, the parietals overlapping the displaced frontal bones, and a large caput over the anterior portion of the left frontal bone. The pains were strong and frequent and with the thought that the fœtus was probably not very big the patient was left for spontaneous delivery to occur.

By 4 P.M. it was manifest that the obstruction was more serious. The anus and vulva were œdematous, the patient much distressed, and the lower abdomen tender on palpation. There had been no advance at all and interference was obviously indicated. A general anæsthetic was administered and a careful pelvic exploration revealed the extension of the leading head to be due to a hand being doubled under the chin. The second fœtal head was found entering the pelvic brim along with the lower part of the neck and upper part of the thorax of the first fœtus. The back of the second fœtus was in the midline anteriorly.

The second fœtal head was pushed up and to one side, the leading head completely rotated and flexed as much as possible after dislodging the hand from under the chin. The whole manœuvre was carried out with the left hand, so that the forceps could be applied without removing my hand from the uterus. The leading vertex was drawn down to the vulva and owing to the distorted (somewhat quadrilateral) shape of the head, bursting of the œdematous perineum seemed inevitable. Right lateral episiotomy was at once performed and the head quickly delivered. The birth of the first infant, a living male, weight 5 lb. 8½ oz., was followed by a sharp intrapartum hæmorrhage. The second bag of membranes was ruptured digitally and the forceps applied to the second head, which was gently drawn down to the vulva, and the delivery of the second living male infant, weight 6 lb. 14½ oz., effected. There was a fair amount of post-partum hæmorrhage, which ceased when the massive placentæ were expelled from the uterus eight minutes later. The episiotomy incision was accurately sutured with silkworm gut.

The placentæ exhibited partial fusion along their margin of contact for a distance of 4 in. by strong bands of connective tissue and placental substance. No large vessel passed over the fœtal aspect of the line of fusion, all the main vessels terminating in each placenta some distance from the fused margins. There were two complete chorionic and amniotic sacs, but along the area of contact the two chorionic membranes had become loosely applied to each other, but could be separated easily by gentle traction. One of the placentæ was of the battledore variety. I regard the case therefore as one of binovular twins.

(1) In this second case the primary extension of the head appeared to be due to a hand and arm being impacted under the chin. This I have found to be a frequent complication in difficult deliveries due to extension and malrotation of the fœtal head. (2) In both these cases the anæsthesia and manipulations were carried out with the patient in the left lateral position. By using the left hand to carry out the manœuvre of rotation of the head the application

of the forceps is greatly facilitated and intra-uterine manipulation reduced to a minimum. (3) When the condition of twin-locking is suspected it is infinitely preferable to interfere early rather than to wait for the impaction to become very severe, when a destructive operation on the leading head would become necessary.

## THE INHALATION OF COMMON PINS

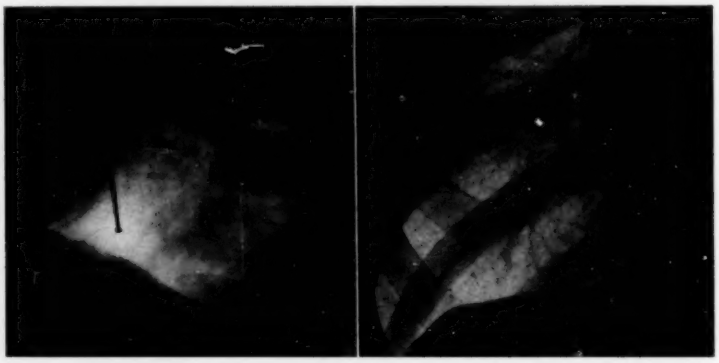
BY J. MCFARLAND, M.D. Liverp., F.R.C.S. Edin., D.L.O.

ASSISTANT THROAT SURGEON TO THE ROYAL LIVERPOOL CHILDREN'S HOSPITAL AND ALDER HEY HOSPITAL, LIVERPOOL

THE following case may interest bronchoscopists, especially as it raises debatable questions.

On Oct. 7th, 1934, a boy aged 13 inhaled a common pin, and a radiogram showed it lying head-downwards in a posterior bronchiole of the right lower lobe. The same day a bronchoscopy failed to discover the pin, nor could I see in the bronchial epithelium any evidence of the transit of a foreign body. No physical signs developed in the chest, and the only symptom was pain in the right hypochondrium, probably reflex in origin and due to irritation of the diaphragm. Several attempts were made to remove the pin under the fluoroscope, but without success, and after seven months there was no change except that the pin had moved downwards and outwards. The boy was quite well and but for a cough showed no physical signs. Apparently neither the pin nor the manœuvres had affected him.

On May 8th, 1935, he coughed the pin into his mouth and brought it to hospital. It proved to be an ordinary common brass pin, tin-coated and about 1½ in. long. A small amount of mucopus adhered to it and there was a little erosion of the tin coating. He has been quite well since.



Lateral and antero-posterior radiograms showing position of the pin.

In two other comparable cases the pin has remained in the lung for six and twelve months respectively, without causing any apparent pathological changes.

One is led to inquire about the state of the lung epithelium in contact with the foreign body during these seven months, and whether a pin could be coughed up without there being any infection present. It has been stated that sooner or later infection will supervene and that therefore every effort must be made to retrieve the foreign body. My own feeling, based on these three cases, is that where a foreign body of small cross-section passes to the utmost depths of the lung, it does not at first set up any dangerous processes. Unless the foreign body can be seen through the bronchoscope it is well to wait until low-grade infection has dilated the minute passages, rather than risk injuring the tissues by seeking for it under the direction of an external observer.

I am indebted to my senior, Mr. P. Leathart, for permission to publish this case.

# MEDICAL SOCIETIES

## ROYAL SOCIETY OF MEDICINE

### SECTION OF NEUROLOGY

AT a meeting of this section held on Jan. 16th the chair was taken by Prof. F. L. GOLLA, the president, and a paper on

### The Spleen, the Liver, and the Brain

was read by Prof. B. BROUWER (Amsterdam). The relationship between these three organs, he said, could be viewed in a wider aspect since the introduction of the study of the so-called lipoidoses. Since Kinnier Wilson had first described hepatocerebral degeneration, knowledge of the clinical syndrome had been extended, and it had been shown that the pathological changes might be widespread in the central nervous system. Various writers had reported families suffering from hepatocerebral degenerations in which some members had no lesions in the brain, and had suggested that the primary lesion should be sought in a damaged liver which produced or passed toxins having a special effect on the central nervous system. There were, however, still differences of opinion. Prof. Brouwer had, he said, had the opportunity of studying three brothers suffering from this disease, with a classical clinical picture: extrapyramidal motor disturbances, brownish-yellow granular pigmentation of the cornea, the so-called ring of Kaiser-Fleischer, and mental symptoms. In two of them autopsy had shown hepatic cirrhosis, splenic enlargement, and symmetrical lesions of the corpus striatum. The neuroglia cells of Alzheimer had been seen. These lesions seemed typical of Wilson's disease, but there had also been a bilateral pathological change in the forebrain cortex: small cavities, increase of glia, and newly formed blood-vessels. The changes were chiefly in the frontal area, gradually diminishing towards the occiput, and strongly suggested a congenital inferiority.

The idea that the toxin in hepatocerebral degeneration was formed in the liver had been influenced by analogy with Kernikterus (icterus gravis neonatorum). In this condition there was usually erythroblastæmia in the blood and liver and spleen. This was, however, secondary and not always present. It represented regeneration after destruction, the destruction having caused the icterus. The brain changes varied from case to case, but the globus pallidus and corpus subthalamicum were chiefly affected. Maternal

toxæmia had been proved to be the cause of this condition. In typical cases of Kernikterus the yellow coloration was not due to liver disease but to hæmolysis. The analogy with hepatocerebral degeneration was not, therefore, a sound one.

A case of hæmochromatosis had been studied by Prof. Brouwer's Institute. This rare condition was characterised by melanodermia, liver cirrhosis, and diabetes, and was almost confined to males. This patient, however, had also had disease of the brain: character changes, followed by confusion, restlessness, incontinence, and somnolence. After an attack the use of the hands and legs and speech had been impaired. He had also shown dysarthria, dysphagia, emotionalism, tremor in both arms, stiffness in the facial muscles, and hypotonia in limb muscles. There had been no pyramidal signs. At autopsy there had been the usual signs of hæmochromatosis, a typical Laennec cirrhosis, fibrosis of the spleen and pancreas, and the cerebral lesions of Wilson's disease. Two kinds of pigment were found in this condition: hæmosiderin and a brown melanin pigment derived from protein. At one time the diabetes and later the cirrhosis had been regarded as the primary factor, but Prof. Brouwer thought there was a disturbance of iron and protein metabolism, of unknown endogenous origin. The pathological changes were all coördinated with one another. Hæmochromatosis associated with pseudosclerosis was not Wilson's disease, but the two conditions could not be very different. Hepatocerebral degenerations probably belonged to that class of metabolic disturbances which were characterised by lesions in organs with congenitally poor resistance. The ætiological factor was unknown.

The question arose whether such disturbances could be limited to special organs. Relevant arguments were found in the "lipoidoses," the three principal ones being Schüller-Christian's disease, Gaucher's splenohepatomegaly, and Niemann-Pick's splenohepatomegaly. The first showed defects in the bones, especially of the skull and pelvis, and the cell deposit was cholesterin. In Gaucher's disease it was kerasin and in Niemann-Pick's disease it was partly lecithin and partly phosphatide. Niemann-Pick's disease was associated with amaurotic idiocy and was characterised by the accumulation of an enormous quantity of large, pale cells filled with fine drops of lipoid, the so-called foam cells, in liver, spleen, and other organs. There was a general disturbance of lipoid metabolism. M. Bielschowsky had regarded amaurotic idiocy as a result of this disturbance. Prof. Brouwer described a case of typical amaurotic idiocy and the post-mortem findings, which supported Bielschowsky's view. The patient was a girl, aged 18 months, with classical symptoms: idiocy, commencing hypertonia of the extremities, and increase of the deep reflexes. In the macula the typical white area with central red spot was found on both sides. The child had had several epileptiform convulsions, developed contractures in the limbs, and died at the age of 2½. Autopsy revealed the typical findings; the nerve-cells of the cortex, basal ganglia, midbrain, pons, medulla, and spinal cord were all swollen and distended by lipoid deposits. Myelinisation was retarded in all four lobes, in the cord, and in the thalamus, but almost normal in the hypothalamus, corpus striatum, and midbrain. Changes were very marked in the cerebellum; in many places the granule cell layer was considerably atrophied and there was increase of glia everywhere. It was obvious that normal fibres might proceed from cells filled with lipoid. The pathological changes were limited to the ectoderm, thus supporting Schaffer's theory that the fundamental process in amaurotic idiocy was a primary affection of the nerve-cells, but in the spleen of this case typical foam cells had been found, though without splenomegaly. During the last months of life the quantity of lecithin in the blood had increased in proportion to the cholesterin.

In conclusion, he said that all the diseases he had mentioned, except Kernikterus, were disturbances of metabolism, and such disturbances need not be general but might show a localisation in certain organs. It depended on the inborn factor which organ would suffer. Chemistry must take the lead in further researches on these subjects.

DISCUSSION

Dr. J. G. GREENFIELD asked where the poisons arose, and welcomed Prof. Brouwer's attention to the neglected corpus subthalamicum.—Prof. BROUWER replied that he thought the poison might be intestinal, but admitted as a research worker that he had seen several cases where the liver had been practically normal, and he did not really know.

Prof. A. MAYER thought that Prof. Brouwer's Kernikterus material might throw some light on the lesion of the globus pallidus appearing at or soon after birth described by Hallevorden and Spatz, and its identity with the status demyelinatus of C. and O. Vogt. He asked if there had been any evidence of birth trauma.—Prof. BROUWER replied that he was sure there was no birth trauma.

Dr. E. PARKES WEBER cited some cases of family cirrhosis where all the usual ætiological factors were absent; he thought such cases were a form of congenital developmental disease: inborn disease which either appeared at birth or was potential at birth and appeared later. Three diseases of this kind were associated with cirrhosis of the liver: Wilson's disease, hæmochromatosis, and generalised congenital developmental telangiectasia (Osler's disease). The most likely explanation of the cirrhosis in Wilson's disease was that it was a congenital developmental dysbiotrophy. Hæmochromatosis belonged to the same group as hæmatoporphyrinuria and alcaptonuria. Why Osler's disease showed cirrhosis was a puzzle, but it certainly did.—Prof. BROUWER observed that there were many cases of lipodystrophy without mental symptoms. He had no experience of Osler's disease.

Dr. GORDON HOLMES, proposing a vote of thanks, commented on the curious systematised susceptibility of parts of the nervous system and mentioned manganese and other poisonings. The primary agents must, he thought, be multiple.

## TUBERCULOSIS ASSOCIATION

AT a meeting of this association held at Manson House on Jan. 17th a discussion was opened by Dr. NOEL D. BARDSWELL on

### After-care of the Tuberculous in London

The organisation of after-care in London differed, he said, from that elsewhere by reason of the enormous size of London and the unavoidable division of responsibility. Each of the London boroughs made its own arrangements, and in consequence considerable variation existed as to the character and scope of this provision. Although in the main London

was faithful to the voluntary principle, the care committees were tending more and more to become official bodies, with, e.g., a hitherto voluntary secretary replaced by a secretary employed and paid for by the borough. The Metropolitan Boroughs Standing Joint Committee had recently expressed the view that care committees should consist of eight borough councillors and seven other members representing voluntary charitable agencies operating in the borough. He doubted whether a care committee of this composition would prove as useful as one chiefly composed of individuals prepared to render personal service to particular patients. On the question whether a single officer or a committee was the better, he thought that when both were first-class there was probably little to choose, but he leaned to a committee with a good secretary, a committee having the advantage that it tapped more sources, spread responsibility, and had greater opportunity of raising funds in various ways. Care work, in the broadest sense of the term, was the determining factor in the future of most patients, but to be effective it must be continuous. There was often a hiatus of a year or more during a patient's stay in an institution. Much might happen in a home during this time. The services of a visiting almoner might prove a valuable link between the patient, his home, and those interested in his after-care. On the vexed question of funds for care committees the L.C.C., Dr. Bardswell said, had always taken the view that a financially aided care committee would merely be an additional relief agency, but although in principle he thought this was a sound view, assistance to be effective must sometimes be immediate, and a care committee should have command of a small fund—preferably raised by themselves—for this emergency work.

### PULMONARY CASES

Not the least important extension of after-care facilities had been the establishment of the industrial settlements at Papworth and Preston Hall, but such settlements though valuable were of course no solution of the after-care problem, since only some 4 per cent. of the patients admitted proved suitable colonists. Work centres run on commercial lines had obvious limitations, but were useful within these limits; while the handicraft classes now to be found in 15 boroughs were one of the most pleasing features of after-care work in London. Woolwich and Deptford had gone further, and had instituted cookery classes for women patients and the mothers and wives of patients. Another growing and effective factor in after-care was the L.C.C.'s policy of rehousing overcrowded households which contained a case of active tuberculosis. During last year 33·5 per cent. of the households recommended for removal by the public health department at County Hall secured new accommodation. The principle of letting houses on a new estate to a tuberculous family was not universally approved. Recently he had addressed a conference on this subject at Oxford and was surprised at the amount of opposition aroused by the proposal, experienced public health workers in the county expressing horror at the suggestion that their nice new municipal cottages should be contaminated by the tuberculous.

Dr. Bardswell concluded with a brief review of the L.C.C.'s scheme for the boarding-out of children from an infected home, or to allow of a mother going away for treatment. On the average 150 children were away at any one time, 25 per cent. to remove them from risk of infection and 75 per cent. to allow of a patient going to an institution. Other directions in which public authorities had in late years eased the burdens of care committees were by the provision of extra nourishment, of dentures, of beds and bedding, and clothes. Finally, he suggested that A.P. refills, even if no longer clinically effective, were an aid in after-care, inasmuch as they kept a patient in constant touch with skilled knowledge of tuberculosis—a most valuable thing.

### SURGICAL TUBERCULOSIS

Dr. J. G. JOHNSTONE (Princess Mary's Hospital for Children, Margate), who followed, confined himself mainly to after-care in children who had suffered from tuberculous disease of bones and joints. It was generally agreed that at the present day a well-organised follow-up system in connexion with surgical tuberculosis was essential for several reasons: (1) Tuberculosis was a generalised infection which manifested itself in active processes at one or more sites, and, having been quiescent, might light up again at any time in the old lesion or elsewhere. (2) Recrudescence in the early stages generally arose insidiously, unknown to the patient, requiring a practised clinician to recognise its occurrence. (3) Arrest of the disease in the case of tuberculous bones and joints did not mean the final end-result. With the arrest of the disease, few cases retained full range of function in the affected part. Partial immobilisation and "posturisation" had to be maintained over a long period to prevent a recurrence of activity and to maintain the optimum position of the area relative to the rest of the body. Between 66 and 75 per cent. of cases of tuberculous arthritis resulted in osseo-fibrous ankylosis which, in the case of children, took several years to become organised and consolidated after quiescence. (4) To maintain the optimum position with relative immobilisation and relief from pressure or friction, some firm mechanical apparatus had to be worn, and this necessitated supervision, repair, and often renewal—depending on the site of disease, age of patient, and other factors—the appliances being eventually gradually discarded at the appropriate time. (5) Tuberculous disease of spine and hip might result in permanent disability from deformity or shortening, necessitating the constant provision of a spinal support or surgical boots. Such conditions left untreated resulted in chronic spinal arthritis in middle life from mere anatomical malalignment. (6) It was frequently necessary to contemplate surgical interference at some future date, and the choice of the proper time should be left entirely in the hands of the surgeon who had had charge of the patient during the active stages of the disease.

It was of vital importance, he said, that effective surgical after-care should be carried out by the surgeon undertaking the in-patient treatment, to ensure continuity in the programme of treatment extended over a period of years. Moreover, his experience at several hospitals working along different lines had taught him that effective supervision in the after-care resulted in cases being admitted at an earlier stage in reactivation, with minor deformities. It was noticeable that cases which came from areas with effective after-care organisation were in better condition that those from areas where arrangements were of an indifferent character. A very comprehensive system of after-care had been developed by the L.C.C. in connexion with cases of surgical tuberculosis—no small achievement in a city like London. Consideration of the after-care began

almost as soon as the patient reached hospital, when an environmental report was received. Notice was taken of the home conditions, and allowance was made in the ambulant period at the hospital before the case was recommended for discharge. The speaker described in detail the procedure followed in three groups of cases: (*a*) those discharged to their own homes within the administrative area of the L.C.C.; (*b*) those discharged to convalescent homes or other institutions; (*c*) those discharged to other areas outside the administrative area of the L.C.C. Ninety-five per cent. of the cases of tuberculous disease of bones and joints discharged to London from Princess Mary's Hospital, Margate, were supervised in their after-care from the central hospital. This after-care clinic was held at the County Hall every Monday. In spite of the steady increase in the attendance roll, there had been no increase in the incidence of reactivation, and there had been a reduction in the development of gross deformities requiring correction. The position was remarkable when compared with the state of affairs only a decade ago, when the percentage of readmissions was high and the disease and deformity well established. Though the after-care clinic entailed considerable time, trouble, and labour, it had proved well worth while. Any orthopædic hospital failing to have a well organised and conducted follow-up scheme was, in his opinion, accomplishing only half its function to the community which it served.

Vocational training, Dr. Johnstone added, was a sound economic and preventive proposition, and he would like to see it extended to a greater number of cases. This country had not yet reached the American standard in the rehabilitation of the cripple into industry, but there were great possibilities.

## LIVERPOOL MEDICAL INSTITUTION

AT a meeting of this institution, held on Jan. 9th, with Dr. C. O. STALLYBRASS, the president, in the chair, a paper entitled

### Some Aspects of Bronchial Carcinoma

was read by Dr. E. T. BAKER-BATES. After pointing out that this disease is recognised more often than it was 25 years ago, he gave reasons for doubting whether there has been a comparable increase in its incidence. The first symptoms, he said, might be hæmoptysis, paroxysmal dyspnœa, or those of pleural effusion or localised pulmonary infection, and in the early case there might be no physical signs. In diagnosis the position of the heart and trachea were of greatest significance. With collapse of the lung, which followed stenosis of a main bronchus, they were displaced towards the affected side—a most suggestive finding. Later, dullness on percussion, diminished breath sounds, and reduction in the hemidiaphragmatic movements were the commonest signs. Radiography might show nothing if the growth was confined to the lumen of the bronchus or if it was retrocardiac. Again the shadows cast by collapse of the lung and the suppuration following bronchial obstruction might obscure the picture. Lipiodol was useful in the early diagnosis and in pleural effusion after air-replacement. It indicated the upper margin of the growth and showed the extent of the intrabronchial growth (rat-tailed bronchus). The outline of the growth was nearly always convex; fusiform narrowing was probably due to chronic inflammatory changes. Dr. Baker-Bates had never seen any deleterious effects due to the lipiodol. The value of bronchoscopy in the early diagnosis and treatment could not, he thought, be over-estimated. The technique had now been mastered sufficiently to permit of its being performed with ease and without discomfort to the patient under local anæsthesia, and it added a certainty to the diagnosis which could not be obtained in any other way, by giving information as to the site and extent of the lesion, and enabling tissue to be removed for section. If any successful treatment could be evolved, its success depended on early diagnosis; one should therefore be prepared to investigate with the bronchoscope all patients presenting any of the recognised manifestations of the disease. Patients with advanced bronchial carcinoma suffered from the mechanical effects of a blocked bronchus, and the introduction of radon seeds which would keep the lumen patent made their lives far more bearable by allowing bronchoscopic drainage and preventing suppurative complications. The duration of the disease depended upon whether the patient had a patent bronchus or not. If the bronchus was occluded the course was rapid, death occurring from inflammatory changes in the "drowned lung" which formed a suitable nidus for pneumonic consolidation and abscess formation. When the growth remained extrapulmonary the progress was slow, and the patient might live in comparative comfort for a couple of years. Deep X ray therapy often gave relief, especially where there were large mediastinal glands producing mediastinal obstruction, but it did not seem to influence the primary growth in the bronchus.

Dr. A. ADAMS said that since the foundation of the tuberculosis service, patients suffering from pulmonary diseases had been coming more and more to the tuberculosis officer for diagnosis, and the voluntary hospital now rarely saw them. This was well illustrated in the figures published by the department in Manchester, where in 1932 there were 138 deaths from cancer of the respiratory system and a record of 89 cases of pulmonary carcinoma given, almost all of bronchial origin. The Manchester area appeared to be the most fertile source of this disease in the kingdom, thus approximating to the mining districts of Czechoslovakia and Saxony. Severe hæmorrhage was a rare complication, but staining of the sputum occurred in about 40 per cent. of cases at some period. The symptoms and physical signs found in the chest were usually caused by occlusion of a bronchus or by pressure. Metastases in the central nervous system were commoner than the published reports suggested. The type of disease described by continental physicians as lymphangitis carcinomatosa had been missed by many clinicians, the X ray appearance being misread as miliary tuberculosis. The recent work of Dudgeon and Wrigley, showing how groups of malignant cells in the sputum could be rapidly recognised, was a valuable addition to the clinical examination. Lipiodol for demonstrating the presence of a growth should be used with great care as it might prevent a patient later being submitted to deep therapy treatment, and was usually not necessary for diagnosis.

Prof. HENRY COHEN emphasised that nearly a quarter of all cases had an acute pneumonic or pleuritic onset. Rarely the radiological features of miliary tuberculosis were so closely simulated by carcinoma that only by post-mortem examination could a diagnosis be established. Nearly 10 per cent. of all cases had a positive Wassermann reaction, though pathological examination proved the lesion to be

malignant; and the association of tuberculosis with malignancy was by no means infrequent. "Unresolved pneumonia" was a seductive though dangerous term, and whilst the radiologist might be justified in using it, the physician should recognise the possibility of an underlying carcinoma in all such cases. A special technique might reveal the presence of malignant cells in the sputum, though a negative finding was of no value. Three of the cases of proved bronchial carcinoma under Prof. Cohen's care had had as their presenting symptom intense lumbar pain, although there was no radiological evidence of metastasis; later the pain radiated up the spine to the neck. The possibility of metastases giving no radiological signs of their presence was offered as an explanation, though no opportunity for confirmation by the post-mortem examination had been afforded in these cases. The superior pulmonary sulcus tumour, described by Pancoast, was usually a bronchogenic carcinoma at the pulmonary apex. He had seen many cases of generalised metastases from a primary carcinoma of the bronchus so small that there was neither clinical nor radiological evidence of its presence during life. All the patients he had referred to surgeons had died within twelve months of operation—with one exception, that of a man with a pedunculated carcinoma removed from the right main bronchus, who was alive and well two years later. Both X ray treatment and radium had given very disappointing results.

Mr. H. V. FORSTER recalled Yankauer's suggestion that in all cases of hæmoptysis in which no tubercle bacilli could be found bronchoscopy should be carried out, and that the endoscopist should encourage the physician to look upon this useful direct method as one not carrying a great risk. As Dr. Baker-Bates had pointed out, the endoscopist could help to relieve pulmonary collapse due to bronchial narrowing, and he himself had been able once to remove to a considerable extent with punch forceps a growth involving the left main bronchus with restoration of ventilation. The question whether deep X ray therapy could be helpful seemed to have been answered favourably by many observers in America. Some patients had experienced relief for as long as five years.

Dr. P. H. WHITAKER emphasised the importance of screen examination in cases of early bronchial carcinoma. It was often possible to detect deficient air-entry before it became clinically apparent by noting limitation of diaphragmatic movement on the affected side. The obstacles to efficient irradiation were difficulty of access and the fact that a large enough dose could not be at present directed on to the tumour. This accounted for the poor results.

Dr. HOWELL HUGHES said that from a surgical point of view there were four main types of bronchial carcinoma; being classified according to radiographical and bronchoscopic findings. (1) Intrabronchial carcinoma, in which the early radiographical appearance was a light increase in the shadow of one hilum, and later, with bronchial obstruction, a dense wedge-shaped shadow spreading from hilum to periphery. (2) Mediastinal, which spread from a large bronchus into the mediastinum, but not peripherally, giving increase of the mediastinal shadow. (3) Peripheral, which spread outwards, and might invade the chest wall, while mediastinal glands were not involved. Radiographically an almost rounded shadow was seen in the lung, making contact with the hilum. Pancoast's tumour described by Dr. Baker-Bates was probably of this type, and merely because of its position and size caused the complications described, and so did not justify a separate group. (4) Parenchymal, which radiographically showed a rounded shadow in the lung distinct from the hilum, with late glandular involvement. In types 3 and 4 lobectomy or pneumonectomy might bring about cure, but in type 1 the most that could be done was to relieve obstruction by means of radon seeds.

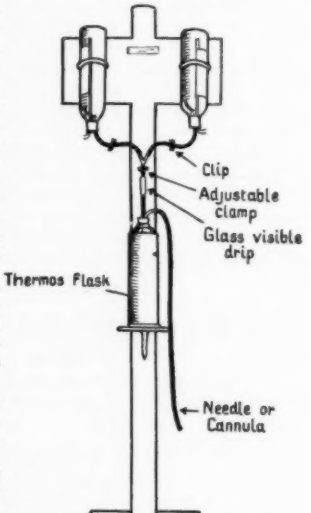
Mr. COSBIE ROSS read a paper on Lipiodol in Surgery of the Biliary Passages.

# NEW INVENTIONS

## APPARATUS FOR CONTINUOUS ADMINISTRATION OF SALINE SOLUTION

THE accompanying drawing shows an apparatus I have designed for giving continuous drip intravenous saline, for use with Crookes's bottles of gum or glucose saline.

It consists of two corks to fit the bottles, each provided with a long and a short tube. When the bottle is inverted, saline runs out of the short tube, while the long tube allows air to flow in, thus preventing a vacuum forming. The short tubes are connected to a Y-piece, below which is an adjustable clamp and a glass visible-drip connexion. From here the saline runs down through a metal U-tube in a thermos flask, where it is heated to the required temperature before it reaches the vein. The whole apparatus is on a stand which places it at the right height above the bed.




The tubes and corks can be removed en bloc from the stand, boiled in a steriliser, and fitted to the bottles. Boiling water is put in the thermos, and the apparatus is ready for use. The two bottles are emptied alternately, the empty one being clamped off and changed for a full one; thus the administration of saline may be kept up for as long as is required.

The apparatus has proved very satisfactory in use, its advantages being that it is easy to sterilise (the contents of the bottles being already sterile), that it never runs out, and that the saline is administered hot. If necessary it can be used to administer saline rapidly instead of by the drip method, simply by unscrewing the adjustable clamp above the visible drip connexion.

It has been made for me by Jack Storey, Station-road, Ashford, Middlesex.

C. E. WATSON, M.R.C.S.,
House Surgeon, King Edward VIIth Hospital, Windsor.

ROYAL SANITARY INSTITUTE.—Mr. John Wilson, chief architect to the department of health for Scotland, will open a discussion on the sanitation and planning of flats at a meeting to be held at the institute (90, Buckingham Palace-road, London, S.W.) on Tuesday, Feb. 11th, at 5.30 P.M.

# REVIEWS AND NOTICES OF BOOKS

## A Text-book of Fractures and Dislocations

Third edition. By KELLOGG SPEED, S.B., M.D., F.A.C.S., Professor of Clinical Surgery, Rush Medical College of the University of Chicago. London: Henry Kimpton. 1935. Pp. 1000. 50*s*.

THIS book presents an exhaustive account of the subject of fractures and dislocations; for example, three and a half pages are devoted to fractures of the laryngeal cartilages. The pathology and mechanism of each fracture is dealt with at some length, and as the unusual types of fracture receive considerable attention, the importance of the work to the practising surgeon is obvious. Different methods of treatment of each fracture are considered and compared—e.g., every type of suture material and every incision used in repair of fracture of the patella is described. The author mentions in the preface that he has been at pains to avoid fads; but from the point of view of the surgeon faced with the immediate treatment of a case, a definite description of the method employed by the author, and evolved by his own experience, would have been helpful. The references in the text and at the end of each chapter to the work and writings of various surgeons should be of great use to the research student.

An individual feature of the book is the method of illustration by line drawings which are tracings from original radiograms. These are well drawn and are most convincing. It is interesting to find that in applying suspension traction for fractures of the femur, the author uses the body-weight of the patient as the extending force, and does not apply weights to the limb. This method, an excellent one in practice, seems to be too little used. Its great advantage is that it allows considerable mobility of the patient, and of the limb as a whole, without upsetting the line of traction or the finely adjusted suspension of the splint. All weights suspending the splint hang at the head of the bed, well out of the way. The section on operative treatment contains an excellent account of the methods of application of skeletal traction, with instructions for avoiding its two main dangers—infection and over-extension. There seems to be some ambiguity in the description of the angle of flexion advised in the treatment of supracondylar fracture of the humerus. An angle "never more than 60," and flexion "as far as possible" are mentioned in the same paragraph (p. 374). Full supination is recommended for this fracture, a position which Böhler and others have condemned on very definite grounds.

We can congratulate author and publishers on a work which is well-produced, clear and precise, and pleasant to read.

## Die Differentialdiagnose chirurgischer Erkrankungen

By W. BRAEUCKER, Hamburg; H. F. O. HABERLAND, Köln; H. KLOSE, Danzig; and M. ZUR VERTH, Hamburg. Edited by H. F. O. Haberland. Berlin: Walter de Gruyter and Co. 1935. Pp. 1180. R.M.52.

THIS large book on surgical diagnosis is intended, the authors affirm, for students and practitioners. It may well prove to be too large a work to appeal to undergraduates, but on the other hand many surgeons will wish to possess it as a work of reference. It is well and simply written and easy to read, and deals systematically with the diagnosis of surgical diseases of all parts of the body. The illustrations, over 450 in number and of high quality, include not only photographs of surgical affections but radiograms of diagnostic interest and very useful diagrams of methods of examination. The section dealing with the nervous system is particularly valuable in this connexion. An attractive and rather unusual feature of the book is the short epitome of treatment which follows the account of each disease.

The work is a creditable compilation of present-day surgical diagnosis.

## Practical Zoology

By H. R. HEWER, A.R.C.S., D.I.C., M.Sc. Lond., F.L.S., Lecturer in Zoology, Imperial College of Science and Technology. London: Hutchinson's Scientific and Technical Publications. 1935. Pp. 118. 5*s*.

THIS book contains a set of detailed instructions for observation and dissection of the usual type-specimens used in an elementary course of zoology, together with an account of methods of fixation, preservation, section cutting, and mounting of specimens. There is nothing particularly original in the subject matter nor in the manner in which it is presented. Those, however, who are about to teach elementary zoology in universities or schools will do well to refresh their memories by a study of its pages and may find that it fits their ideas closely enough to enable them to base their course on it. To students working on their own this book should prove extremely useful.

## 1. Elementary Morphology and Physiology for Medical Students

Second edition. By J. H. WOODGER, D.Sc., Reader in Biology in the University of London. London: Humphrey Milford, Oxford University Press. 1935. Pp. 498. 12*s*. 6*d*.

## 2. Practical Biology for Medical Students

By C. J. WALLIS, M.A., Master-in-charge of Biology, University College School, Hampstead. London: William Heinemann (Medical Books) Ltd. 1936. Pp. 247. 12*s*. 6*d*.

1. The large number of books on elementary zoology which have appeared during the past twenty years may roughly be divided into two classes: those which describe the structure of a series of animals in entire isolation from one another (the majority), and those which deal with general principles but do not give sufficient facts to make those principles intelligible to the beginner. As an introduction to comparative morphology Dr. Woodger's book is one of the best we have seen. The structure of the types and the embryology of the vertebrates are well described with good illustrations, and the facts are coördinated and are given a real significance in relation to general principles such as adaptation and evolution. It is in fact a book which can be read with interest during a course of dissection. The emphasis is laid on morphology. This for beginners is probably advisable, and the author has not given as much life to his chapters on physiology as he has done to those dealing with structure. It is to be regretted that in the last theoretical chapter, which has been rewritten in the second edition, the evidences for the theory of evolution are not discussed in the light of the relevant facts which are all supplied in various places but not coördinated.

2. This is an improvement on other elementary practical books in that an attempt is made to illustrate the principles of biochemistry and physiology from animals as well as from plants. The experiments suggested are such as can be performed without complicated apparatus. It is to be regretted that simple experiments in animal physiology such as the action of cilia, muscles and nerves, fertilisation, growth, and regeneration are not included. The directions for dissection, preparation of slides, and observation of embryological material are good, but not better than those to be found in many other text-books.

## Traité de physiologie, normale et pathologique

Tome X. (deux fascicules). Edited by G. H. ROGER, Hon. Professor of Physiology, and L. BINET, Professor of Physiology in the Faculty of Medicine, Paris. Paris: Masson et Cie. 1935. Pp. 1580 (2 vols.). Fr.220.

ALTHOUGH this work consists of 11 volumes, that now issued, Vol. X., completes it, for the eleventh volume has already run into two editions. Vol. X. is the longest of all, and is divided into two separately bound parts, the second of which deals mainly with the special senses. Multiple authorship makes inappropriate any general criticisms; some of the articles would make books in themselves. It would almost be easier to review the Bible, which is at least divided into the Old and New Testaments. The subjects now treated are as follows: psychophysiology, cerebellum, pons and medulla, spinal cord, cerebro-spinal fluid, cranial nerves, autonomic nervous system, physiology of skin, touch, speech, hearing, vision, taste, smell. The style and approach of the numerous authors are as various as their subjects, but the articles on the cerebellum and the autonomic system may be picked out as most in keeping with the modern physiological viewpoint. The former is based on phylogenetic as well as on experimental studies, and is as sound an account of cerebellar function as could be written in the present state of the subject. The latter provides an excellent historical résumé of the numerous generalisations which have been attempted from time to time on the function of the vegetative nervous system, besides giving a good account of its physiology. The bibliography of the article on the cerebellum is good, and the list of references to literature on the sympathetic and para-sympathetic appears to us to be exhaustive.

The other articles, with the exception of that on speech which treats the subject historically and is extremely interesting, are dominated by the old "anatomical" tradition; they are encyclopædic but lack vitality. One must hasten to add that reflex action is dealt with in Vol. IX. of the series, and in a comprehensive work of this sort a place must be found for the bread and butter as well as for the cakes and ale. Although some of the sections make dull reading, this is often inevitable and does not detract from their value for purposes of reference. The well-illustrated and full account of the cranial nerves and their lesions is excellent, and is perhaps the most conscientiously written part of the book. The article on the cerebro-spinal fluid also contains much useful information, clinical and pathological as well as physiological. The remainder of the articles are no more, and sometimes rather less, than one would expect. The physiology of the skin is treated thoroughly and unimaginatively, but is misplaced, having nothing to do with the nervous system; there is a separate section on the physiology of touch. If the skin article had been omitted and that on vision correspondingly enlarged (and treated as methodically), the balance of the book would have been improved.

Speaking generally, we can definitely recommend this volume as useful, particularly to those wishing to restore contact with the often neglected French literature. In places it is outstanding, and those who contemplate adding it to their library will be well advised to consult its pages on the subjects in which they are especially interested and be guided by their impressions after such a survey. Most of them will proceed to business.

## Diseases of the Nose and Throat

*For Practitioners and Students.* By CHARLES J. IMPERATORI, M.D., F.A.C.S., Professor of Clinical Otolaryngology, New York Post-Graduate Medical School; and HERMAN J. BURMAN, M.D., Instructor of Clinical Otolaryngology to the Medical School. London and Philadelphia: J. B. Lippincott Company. 1935. Pp. 723. 35*s*.

THIS book is, as stated in the preface, written to supply answers to the questions with which the practitioner and senior student are constantly confronted, "what is the diagnosis of this condition and how shall I treat it?" The arrangement is unusual, in that symptoms, diagnosis, and treatment are placed first, and the pathology and causation of the diseases are considered at the end of each discussion; this has the advantage of enabling the busy reader to find the treatment recommended quickly, but it often makes it difficult to visualise the precise condition under discussion. For instance, the symptoms, diagnosis, and treatment of ulceration of the nasal septum are described, and at the end of the section we find, under the heading ætiology, that it may be caused by such general diseases as tuberculosis and syphilis which, however, have not been mentioned in the paragraph on treatment.

The book is arranged throughout in tabular form, which does not make for easy reading; indeed, it is obviously intended rather for quick and ready reference than to give the student a comprehensive knowledge of disease. This method is unsuited to teaching the characteristics and behaviour of such a protean affection as tuberculous laryngitis, or to giving real help in the diagnosis of cancer of a vocal cord. The arrangement of the work naturally makes for dogmatism and for errors of statement. Of malignant disease of the tonsil it is said that extirpation by surgery or electrosurgery is imperative; treatment by radiotherapy, not mentioned here, is discussed in a separate section of the book. Killian's operation on the frontal sinus is recommended as the external operation almost universally employed; in this country it has been largely replaced by a limited opening through the floor of the sinus with removal of the fronto-ethmoidal cells. In the treatment of chronic laryngitis, potassium iodide in doses of 15 *drops* is advised.

These criticisms are called for. But the important thing remains that the work is exhaustive in scope, covering concisely almost every disease and lesion of the throat and nose; the technique of methods of examination and treatment is well described and illustrated, and there is a good index. While it is hardly to be recommended to the student desiring to gain his first general knowledge of the specialty, it will be useful to him, and to the practitioner.

THE LANCET

*LONDON: SATURDAY, JANUARY 25, 1936*

## KING GEORGE V

ALTHOUGH the final illness of His Majesty KING GEORGE V. was brief the country had been acquainted by regular bulletins of the ominous nature of his symptoms. All must have known from the very onset, medical men and public alike, that the issue might be the gravest, taken in connexion with his serious illness of seven years ago. We then had laid before us, in regular and candid statements, the story of a brave man's struggle, now advancing, now declining back, now reaching a point when victory might reasonably be expected, and now falling to the level when nothing but defeat could be anticipated. The story, then unfolded to us with pathetic clearness, none can have forgotten, and the wonder has been that the survivor of such an ordeal should have been able to face the responsibilities of a real and active monarch, one who lived up to his own ideal as father of his people. Great worker and great sportsman as the KING was he met with anxious conscientiousness his multifarious engagements despite his physical delicacy. He lived and he has died a great King, and not only is this the knowledge of his sorrowing subjects to-day, but it will be the certain verdict of posterity when the vast events of his reign are seen in their proper perspective. It is a fine and consoling reflection that the occasion of his jubilee offered a unique opportunity for a demonstration of genuine affection and admiration from all classes, and his last broadcast, put the seal upon those feelings of love which were felt for him as a man. The KING spoke, with obvious emotion, of the personal link existing between himself and his people. "I am thinking," he said, "not so much of the Empire itself as of the individual men, women, and children who live within it, whether they are dwelling here at home or in some distant outpost of the Empire." His closing words were: "I send to you all, and not the least to the children who may be listening to me, my truest Christmas wishes, and those of my dear wife, my children, and grandchildren who are with me to-day." The message was heard throughout the world, and drew for the millions who heard it a picture of the great ruler as one who cared for his subjects as a father.

KING GEORGE V. was born on June 3rd, 1865, at Marlborough House, and succeeded to the throne on May 6th, 1910, being crowned at Westminster Abbey in June of the following year. He was the only surviving son of his father, an elder brother, the Duke of Clarence, having predeceased that father. For a brief period he made use of the ancient royal title of Duke of Cornwall, until, after a fitting interval, he became Prince of Wales. Before he was heir to the throne he remained a working officer in the Royal Navy; his record in the Senior Service was that of a capable and strenuous officer, and he never lost his deep love of the sea. There is no doubt that the devotion to duty and the bonne camaraderie which distinguishes the personnel of the Navy counted for much in the manner in which the KING met his responsibilities and filled his post as the National Chief, for rectitude, simplicity, and sympathy formed his daily expression of conduct. Assuredly in the dealings of his kingdom with other countries these plain characteristics of our ruler played an effective part. He may not have had the intimate knowledge of the Royal circles of Europe which made his father so conspicuous a figure in continental politics, but he was as free from party bias as KING EDWARD, and as firm in the times of political unrest prevalent at his accession to the throne as his father had been before him, as respectful to the constitution and to the authority of Parliament, and as sound in his knowledge of affairs. When all political dissensions became of secondary importance to the nation by comparison with the world issues in which the war involved the Empire, KING GEORGE, in public and private capacity alike, proved himself a veritable leader and example. He was throughout unsparing in his efforts, loyal to his advisers, and a sharer practically in the anxieties and privations of his subjects. Thus in the third period of his reign he reaped a splendid harvest of personal affection from his subjects who year by year and even day by day grew to have a better understanding of their KING. We all knew that he was a good man, and it must surely add poignancy to our grief to recall that this patriot in the largest sense had so intimate a love for England. The KING'S love of England, English scenes, English sports, and his English domestic life endeared him to his subjects in a very particular sense. It has been well known to his medical advisers for some years past that he could have enjoyed more certain health and probably prolonged his days by spending the winter months at warmer and more sheltered places than his London or his Sandringham homes, but the KING remained in England not only from that sense of duty which made him the most serviceable of monarchs, but because the Norman castle, which gives to the Royal House its present name, and the heaths and marshes of Norfolk made an appeal to him more urgent than the balmier prospects of the continental health resorts could offer. He did not avail himself of climatic advantages which are only open to a small

proportion of his fellow Englishmen, and in their memory of him this will count.

To the profession of medicine KING GEORGE V. was always a sterling friend, and although his name is not associated, as is that of his father, with any medical movement of a significance comparable to the foundation of King Edward's Hospital Fund, it has been abundantly apparent that in deed as in will he realised the importance, in all the social history of to-day, which underlies medical service. And his deep interest in the voluntary hospitals of the country was manifested in the ægis which he extended to the voluntary hospital movement, where he carried on his father's work, and in the fact that during his reign it became an established tradition that members of the Royal Family should be heads of hospitals, and that the Royal Family should take part in a practical manner in all developments of medical charity.

## THE CAUSES OF VARIATIONS

THE discovery and use of cabbages which would stand the winter in northern climates was an event of a sanatory importance comparable to that of the invention of vaccination against small-pox. When there were no winter greens available for man and no turnips or swedes to provide fresh meat, the population must have come to the early spring in poor trim, for scurvy and near scurvy must have been the common lot and dovecots were only for the few. The first flush of edible green in the countryside is still often welcomed by nibbling the hawthorn buds on the roadside though perhaps those who do it know the reason for their ritual as little as the cook knows why there should be greens of some sort every day. With his unerring instinct for what is good, man seized on the cabbage and has grown it in one form or another as universally as he has the potato, partly for himself and partly for his animals. And many varieties there are—spring cabbage, curly kale, cauliflower, brussels sprouts, kohl-rabi, and the rest. All of them breed true to seed and with ordinary luck we can have kale or broccoli at will, which means that all this variation is due to germinal changes and not to environment or special methods of cultivation. They are all in fact sports, or as we say nowadays mutations, of the plain wild *Brassica oleracea* which lives here and there on our southern coasts and behaves in winter like any natural biennial plant.

And in the eighteenth century, along with the introduction of cabbages and turnips and the depopulation of dovecots, began the revolution of thought which led men to suspect that they lived in a moving world and not as they had supposed in fixed and settled surroundings which had nothing more to expect than the crack of doom. They began to see change and infer it and to be curious about its nature and causes. Their thoughts crystallised once about the origin of species and have crystallised again in this century from MENDEL'S discovery of unit characters and alternative inheritance. At the moment there is a pretty general consensus of opinion that many of the features of animals and plants are primarily determined by specific particles in the chromosomes, and there is abundant evidence that the sudden heritable changes, which are always found if large populations of live organisms are closely examined, are due to changes in these genes. Mutation is a plain fact of nature, and there is no visible end to the possibilities which would be to hand if its occurrence could be brought under control. It would indeed be strange if people were not acutely interested in trying to discover the causes of germinal changes, in the hope of promoting good things such as brussels sprouts and of preventing evil things such as idiots. Our readers will therefore perhaps be interested in a paper which Mr. HAMSHAW THOMAS, F.R.S., of the Cambridge botany school, gave to the Linnean Society, printed in the last two numbers of *Nature*. The particular point which he discusses is the possible influence of the penetrating radiations known as cosmic rays which pour on to the earth out of space and take origin very possibly in the annihilation of matter. That this kind of influence can cause mutational change was established when MULLER obtained heritable variations by the action of X rays. But whether short wave-length radiations have any special action apart from their ability to penetrate cells and, by virtue of their small size, to injure only a limited part of a cell, is uncertain; it is perhaps generally true that if many cells are knocked about by any harmful agent a proportion of them will suffer only that particular local damage required to produce a mutation. Be that as it may, and admitting the probability that HARRISON brought about germinal changes by feeding caterpillars with poisonous salts, the influence of radiation is an attractive suggestion. Experiments in which animals have been more or less shielded from cosmic rays by being kept as far as may be in the bowels of the earth have so far given no clear answer; negative results of observations which are in the evolutionary sense of momentary duration are of no great weight. Cosmic rays are few and far between; many of any chromosomal injuries which they may inflict would be incompatible with life and in any case only a minute proportion of germ cells give rise to individuals sufficiently adult to show their characteristic features. Dr. HAMSHAW THOMAS appeals to evidence of another kind. It being known that the intensity of cosmic radiation increases greatly with altitude so that there is about ten times as much at 20,000 feet as at sea-level, he points out that there are many more kinds of plants on mountains than on plains, they they are more variable and include a larger number of peculiar local species. Thus Costa Rica, largely mountainous and only half the size of Florida, contains as many species of plants as the whole of the south-eastern United States; there are 60 varieties of wheat in Afghanistan and only 12 in Italy, and many more mountain than lowland species of primula, while several naturalists have remarked on the abundance of endemic species on mountains.

Of these facts there are obviously other possible explanations, but Dr. THOMAS's suggestion that an abundance of cosmic rays is responsible for an excess of variation needs further examination and, if possible, experiments on a large scale. If there is much in it, it would probably be apparent in a thorough study of the high Andes where there is a considerable human population, partly native, partly immigrant, which badly needs examination against the background of Western medicine. The question is one of great theoretical and practical importance, and it is perhaps not too much to hope for a more or less permanent commission to be established there to see what can be ascertained about the variability of men, animals, and plants, and to make a thorough study of the medical position there. It is true that cosmic radiation is not as abundant in Peru as it is further north, but the presence of a considerable indigenous population well outweighs this disadvantage. Man is far better known than any other animal, and careful observation should be able to determine whether he is more liable to mutations in the Andes, possibly also in Tibet, than elsewhere. And where man lives experiments can be made, though in this connexion where great numbers and long times are involved observation may be more likely to find an answer.

## A NEW PUBLIC HEALTH CODE

THE statute book is, in CROMWELL'S phrase, an ungodly jumble. More than any other department the Ministry of Health labours to remove the reproach. Not long ago the departmental committee, which it had appointed under the chairmanship of the late Lord CHELMSFORD, produced the admirable code which became the Local Government Act of 1933, re-writing in modern language and compendious form a mass of confused and overlapping enactments. And now the same committee, under the experienced guidance of Lord ADDINGTON, has produced another big Bill (Cmd. 5060; 3*s*. 6*d*.) which forms a draft code of the existing laws of public health. Overhaul of our health legislation was indeed overdue. The principal act of 1875, parent of a scattered progeny, was itself descended from acts of 1848 and onwards which it all too faithfully reproduced. Much has happened in Whitehall and in the countryside since those early years when panic over an epidemic of cholera was one of the chief motives of legislation. Prevention, and not merely cure, of disease is now the accepted policy. The individual's health is recognised as the community's concern. Slum clearance, water-supply and sewerage, maternity and child welfare, and school medical services are related parts of a national effort. Comparison of ancient and modern statistics of cholera, plague, and small-pox, typhoid, diphtheria, and tuberculosis, is a sufficient reminder of progress. In the statutory structure of public health over the same period the central and local authorities have been transformed. The Ministry of Health has replaced the Local Government Board of 1871. Boards of guardians are gone. Popularly elected county councils, created in 1888, now form, with county boroughs, fewer and bigger units; with ampler resources, a wider outlook and a rational re-allotment of institutional facilities, they administer public health in the spirit of social service rather than of poor relief. A principal act of 1875 was hardly fit to govern such developments.

The departmental committee was directed not only to frame consolidating legislation, but also to consider what amendments would facilitate their work and would secure simplicity, uniformity, and conciseness. Fifty-year-old clauses will not stand literal reproduction to-day. The 1875 Act, for instance, contained no fewer than four differently expressed provisions as to power of entry. Pure consolidation would dictate the separate re-statement of each in the new code, but common sense will substitute one uniform provision for four. Elsewhere a handful of random examples will show the opportunity for unobtrusive modernisation. Section 134 of the 1875 Act enabled regulations to be made for speedy interment of the dead and house-to-house visitation in times of formidable epidemic. No such regulations have been made for many years, and the section can clearly be dropped. Nor is it necessary to reproduce Section 138 whereby poor-law medical officers and other doctors who attend patients on board ship (under regulations prescribed by Section 130) can recover charges from ship-owners; the provision is a dead letter. An enactment of 1907 forbade the connexion of drainage with a rain-water pipe; modern sanitary practice is against connecting a rain-water pipe with a sink; the new clause incorporates a restriction to this effect. The 1875 Act, as already noted, was itself framed out of a group of earlier statutes. Perhaps this is why it uses, without definition, sets of alternative phrases abhorrent to the modern draftsman. It speaks of "infectious disease," "fever or other infectious disease," "infectious disorder," "dangerous infectious disorder," and "dangerous infectious disease." The Customs Act of 1876 uses the phrase "highly infectious distemper." The Infectious Disease (Notification) Act of 1889 contains a catalogue, it is true, of specific "infectious diseases"; but the vocabulary of the acts is needlessly confusing. The new code uses simply the two phrases "infectious disease" and "notifiable disease." Incidentally, in re-stating the list of "notifiable diseases" from the 1889 Act, it omits to specify the fevers therein described as "continued or puerperal"; the "continued fever" was an old term, covering undiagnosed pyrexias, which is nowadays of little significance, and "puerperal fever" is left, for administrative simplicity as well as on medical grounds, to be governed by regulations such as those whereby in 1926 the Minister made puerperal pyrexia notifiable. On the whole the committee, composed of members with legal and administrative rather than medical qualifications, has refrained from stiffening the law in directions where medical opinion might have recommended it. The committee found its hands full enough without pursuing

medical questions. It leaves the general improvement of the law to future parliamentary effort.

The new code consists at present of 334 clauses. Had it dealt with every aspect of what might popularly be regarded as public health, a thousand might have been required and an unwieldy document would have resulted, with multiplied vulnerabilities. The project excludes housing, mental treatment, midwives, burial and cremation, building lines and open spaces, and those unrelated Home Office topics which have been grouped in public health acts of the past. It confines itself to strictly public health provisions in relation to the prevention and treatment of disease—i.e., as regards environment, the arrangements for drains and sewers, water-supply, buildings and the abatement of nuisances, and, as regards personal hygiene, arrangements for hospitals, maternity centres, and the like. The draft bill covers the Canal Boats Acts, the Baths and Washhouses Acts, the Maternity and Child Welfare Act, 1918, the Nursing Homes Registration Act, 1927, and the infant life production provisions which are the sole surviving part of the Children Act, 1908. Its plan and its limitations, and the details of its proposed changes, are set out with well-reasoned justifications in the blue-book (Cmd. 5059; 2*s*.) which accompanies the bill. One final word of warning we respectfully add. Under technical parliamentary rules a bill which is purely consolidation cannot be amended. The process of consolidation with amendment is usually performed by framing one bill for consolidation and another for amendment, the latter being passed first and then swallowed up by incorporation in the former. This process was not adopted with the new Public Health Bill if for no other reason than that the separate amending bill would have been distracting in its complexity and unintelligible in its terms. As the new bill includes a modicum of amendment along with pure consolidation, it is open to any member of Parliament to propose further amendments. If such a right is exercised on a large scale, the bill is doomed, and all the disinterested labours of its expert authors will be lost. The same situation arose over the parallel Local Government Bill in 1933, but private members nobly refrained from sabotage and the code was successfully passed into law. Those who are not satisfied with the new public health code should hold their hands and effect their amendments by separate bills in the future. Amendment indeed will be far more easy once this clear code receives the Royal Assent. To choke it to death now by excessive alteration would be a crime against public health administration.

# ANNOTATIONS

## STAMMERING

ANY defect of speech is a serious handicap to a school leaver in search of employment. Stammering is far the commonest of speech defects; about one child in a hundred stammers, four times as many boys as girls. The stammer differs from other speech defects in two respects: under certain conditions no stammer is apparent, and it does not respond to the usual speech-training methods—suggesting that a stammer must be more than a mere defect of speech. Regarded as a speech defect it is essentially an interference with the coördination of the muscular articulatory mechanism, associated with some disturbance of respiration, particularly, according to Seth and Guthrie, of the synchronisation of thoracic and abdominal breathing. Its more obvious manifestations take usually one of two forms: the "clonic," popularly known as the stutter, in which the sound to be produced is repeated several times; and the "tonic" in which a silent period, long or short, precedes utterance of such sounds as give difficulty. The "tonic" form may be accompanied by spasmodic contractions of the muscles of face, lips, larynx, or even limbs, which appear to take the place of the articulatory contractions of the stutter.

Many theories of causation have been advanced, but there is a growing convergence of opinion to-day towards the view that stammering is in essence a neuropathic condition and as such therefore may be attributable to many causes. It cannot have escaped the observation of any students of the condition that stammerers are usually nervous children. A special inquiry[1] among Manchester school-children, initiated by Dr. H. Herd, revealed the frequency of neuropathic symptoms such as excitability, irritability, abnormal fears, enuresis, night-terrors, nail-biting; 41 of 53 stammerers were of a very excitable type. These symptoms are not the result of the stammer, but are parts of the stammering syndrome. Stammering, then, is not merely a disorder of speech, but a disorder of personality, an emotional disturbance. Stammerers are, in fact, one type of "difficult child." As is shown in a Rochdale inquiry,[1] it is the child who lives in an "atmosphere of over-solicitude" whether through his place in the family, through illness, or other cause who, when some crisis (to him) occurs in his life—the arrival of a baby sister or brother, change of school or teacher, fright, loss of a parent, family disharmony—fails to adjust normally and may develop a stammer, just as he may develop asthma.[2] There may, in addition, be some inherited neuropathic tendency, difficult often, however, to separate from the environmental influence of a neuropathic parent.

Realisation of this wider aspect of stammering involves some enlargement of the scope of treatment beyond the mastery of vowels, of consonants, and their combinations. The methods of a child guidance clinic may have to be employed in order to deal with possible maladjustments and to elucidate the subtle psychological factors, if such there be. In the solution of these matters the parent and the teacher may have a large part to play. So far as the individual child is concerned, the first essential is the production of self-confidence; its lack is characteristic of the stammerer and the inferiority complex is most manifest in the presence of strangers. This defect must be steadily overcome by the suggestion of the teacher. Next in importance to suggestion is relaxation, the significance of which is apparent

[1] Quoted in "The Health of the School Child" (report of the C.M.O. of the Board of Education for the year 1934), p. 101.

[2] THE LANCET, Jan. 11th, 1936, p. 96.

from the tenseness of effort displayed by the stammerer in his struggles to speak. Natural speech should proceed in an easy flow. The act of speech should be more or less unconscious; there should be no sense of strain, no tensely contracted muscles. The habit of general muscular relaxation can be fostered by exercises alternating with short periods of complete rest. The older method of speech therapy involved a too intense concentration of effort on the production of sounds and contradicted the principle of relaxation. For this reason some authorities have dispensed with any specific speech training and have concentrated, if the use of the word is allowable, on relaxation. This treatment has been advocated and practised by the London education authority with considerable success under the control of Dr. E. J. Boome. The careless habits of speech, however, that many stammerers develop do justify some practice at least in correct speech in the form of reading along with others, or reciting in dramatic form, conditions under which a stammer naturally tends to disappear. Parents and teachers must coöperate if a satisfactory result is to be reached and retained; education authorities should modernise their methods of treatment in accordance with recent knowledge, invoking the help (see p. 225) which the Central Association for Mental Welfare offers.

## SUPPLY OF BLOOD-GROUPING SERA

FOR an efficient and safe transfusion service it is necessary to determine quickly and accurately the blood group of prospective donors. In practice this requires stock sera against which the grouping can be tested, but so far the blood-grouping sera on the market have for the most part been unstandardised as regards potency, and the expense has militated against their general use. For these reasons it has been the custom of various independent laboratories to make their own stock blood-grouping sera from Group 2 (A) and Group 3 (B) individuals, any member of the staff, whose blood was of either group, being considered a convenient source of supply. The amount of isoagglutinins, the responsible factors in such sera, has not, with rare exceptions, been estimated. Dr. H. F. Brewer, medical officer to the British Red Cross Blood Transfusion Service, working on the blood donors of this organisation, has found a normal variation ranging from 1 in 2½ up to 1 in 800 in the titre of the $\alpha$ and $\beta$ isoagglutinins in the sera of Group 3 (B) and 2 (A) donors respectively. Repetition at intervals of the titre estimations on batches of donors proved that the titre of isoagglutinin content for the serum of a particular donor is practically constant. A point of interest is that the average titre of the $\alpha$ isoagglutinin in Group 3 (B) serum is higher than that of the $\beta$ isoagglutinin in Group 2 (A); this has also been pointed out by K. Kettel, and applies to the $\alpha$ and $\beta$ isoagglutinins present together in the serum of Group 4 (O) individuals. The isoagglutinin titre of grouping serum gradually deteriorates with storage, and obviously the higher the initial titre the longer will be the period during which it can be used; a serum with an isoagglutinin titre of 1 in 200 will maintain a satisfactory potency as regards agglutination for a period of six months, even at room temperature. If the initial titre should be less than 1 in 25, it may deteriorate within this time to such an extent that it fails to clump red cells containing the homologous isoagglutinogen, and an error in blood grouping will result.

In an attempt to make a supply of grouping sera of high titre and of cheap price generally available throughout the country, the Red Cross Transfusion Service has arranged to provide free to Messrs. Burroughs Wellcome and Co. serum in bulk from Group 2 and Group 3 donors specially selected on account of their high isoagglutinin titre (1 in 200 or above); such serum will be put up in capillary tubes each containing about 0·1 c.cm. and packed by the firm mentioned at a cost just sufficient to cover expenses, and will be distributed from the Blood Transfusion Service, 5, Colyton-road, East Dulwich, London, S.E.22 (Tel.: Forest Hill 2264), to whom application can now be made. The price is 6*s.* per dozen pairs of capillary tubes if supplied to hospitals, medical practitioners, and provincial services affiliated to the London service; 12*s.* per dozen pairs to non-affiliated hospitals and others. Instructions about blood-grouping technique will be enclosed. The scheme should facilitate blood transfusion generally by rendering blood grouping more readily available and more accurate. At the present price it may be practicable for every medical practitioner and medical institution to keep a supply and replenish it when there is any risk of staleness. Undue calls on Group 4 (O) ("universal") donors should now diminish.

## THE SURGERY OF THE SYMPATHETIC

A BRIEF report of the Tenth Congress of the International Society of Surgery appeared from a correspondent in THE LANCET of Jan. 11th.[1] In this report mention was made of the plea put forward by Prof. Archibald Young, of Glasgow, for the consideration of peri-arterial sympathectomy in properly selected cases, Prof. Young contending that though the discussion before the Congress was nominally restricted to the surgery of the lumbar sympathetic it would have been more profitable if it had been extended to include the results obtained by numbers of surgeons from peri-arterial operations in the limbs and on the inferior mesenteric artery, and also to review their experience of presacral neurectomy. He repeated the claims which he has formulated elsewhere for peri-arterial neurectomy which in his opinion had suffered undeserved neglect, stating that in his hands the operation had yielded satisfactory results in 65 per cent. of cases. Turning to lumbar ganglionectomy he stated that in his experience the operation had given excellent results in Raynaud's disease, and that more was to be expected of it in arteriosclerosis than in thrombo-angiitis obliterans. He had experienced striking success in a few cases of chronic arthritis and this encouraged him to advocate lumbar ganglionectomy though the patient may be bedridden. He also referred to the treatment of Hirschsprung's disease and of painful conditions of the bladder by operations closely allied to lumbar sympathectomy.

## AVERTIN ANÆSTHESIA IN CHILDHOOD

EVIDENCE of the interest taken in Sweden in Avertin anæsthesia will be found in four papers published in *Nordisk Medicinsk Tidskrift* for Dec. 21st. It was in August, 1932, that avertin was first adopted by the large children's hospital, Kronprinsessan Lovisas Vårdanstalt, and between this date and the end of October, 1935, it has been used in 1259 cases without mishap and with excellent results. Its administration in an enema saves the child from the struggling and the psychic disturbances which

[1] We take this opportunity of mentioning that the official representative of the Royal College of Surgeons of England at the congress was Mr. C. H. Fagge.

sometimes follow the application of an ether mask to the face, and the profuse bronchial secretion evoked by ordinary ether anæsthesia is also avoided. Ether is not, however, totally dispensed with in this hospital, and a little is usually given (from 10 to 30 c.cm.) after consciousness has been lost under avertin. Dr. Einar Perman, who provides this information, states that avertin was first used only in exceptional cases and when lesions of the respiratory tract contraindicated ordinary inhalation anæsthesia. Its advantages, however, soon became so evident that it has now been adopted as the standard anæsthetic for children, who do not react to it with the psychic upsets occasionally seen in adults. Avertin is now used for all circumcisions and operations for hernia and mastoid disease. In many cases of empyema difficult to locate, the exploratory punctures as well as the operation itself are performed under avertin, which has also proved valuable for cystoscopic examinations. In another paper, Dr. Georg Bremer reports from the same hospital his observations on avertin anæsthesia in dentistry. He has found avertin the solution to the problem of the child under school age requiring unavoidably painful dental treatment. His experiences in this field since the beginning of 1934 concern two-score children and a couple of young adults whose mental condition would have been a contraindication to any dental operation carried out with only a local anæsthetic. The remaining two papers describe the treatment of tetanus with avertin—a method familiar in this country through the writings of L. B. Cole [1]—and the temperature of the skin during avertin anæsthesia.

## THE PHYSIOLOGY OF FERTILITY

RECENT analyses of population trends suggest that reproduction, not only in England and the rest of North-West Europe but also in other regions inhabited by Europeans, is proceeding at a dangerously slow rate, and that unless a pronounced increase in the number of births occurs before long, the relevant populations will be considerably diminished and their age constitutions greatly altered. In an address delivered to the Eugenics Society on Tuesday last, Dr. S. Zuckerman suggested that this fact puts a completely different complexion on the usual view that is taken of man's fertility. Even allowing for full working capacity, the human reproductive machine does not compare favourably with that of most other vertebrates, for even apart from specially designed contraceptive measures, many normal and pathological factors militate against a higher fertility. For example, the childbearing period in woman forms a relatively short part of her total life compared with that of most other mammals.

The normal limiting factors to the process of conception itself, said Dr. Zuckerman, are not conducive to a very high fertility. Ovulation both in man and in old-world primates, it is now believed, occurs at some time during the middle period of each menstrual cycle. Occasionally, too, and for reasons not yet understood, ovulation may fail to occur in otherwise normal menstrual cycles. There are no data regarding the viability of the ovum of any primate, but if investigations on lower mammals are any guide, the human ovum does not live more than a matter of some hours. Sperms are also short-lived, and unless the male and female gametes meet within a fairly brief critical period conception during any given cycle is impossible. Man and most of his fellow old-world primates do not experience, as do most other mammals, a sharply demarcated œstrus which would ensure that insemination occurred at the most favourable time for conception, and it would almost seem that an increased frequency of coitus is the primate mechanism which replaces from this point of view the œstrus of the lower mammal. Discussion still continues on the question of the occurrence of a "safe period" in the menstrual cycle; the balance of clinical evidence seems to be in its favour. Dr. Zuckerman pointed out that in the absence of any available sign of ovulation in man, the further analysis of the "safe period" into its two components, the period of viability of the sperm and the period of viability of the ovum, is clearly impossible. Such an analysis is at present being conducted on monkeys which in their sexual skin cycles provide a clear external index of the occurrence of ovulation. The data so far collected do not provide any information on these two particular points, but clearly support the idea of only a limited period of fertility in each menstrual cycle.

[1] THE LANCET, 1935, ii., 246 and 256; Quart. Jour. Med., 1935, iv., 295.

## DILATATION OF THE URETERS

A LEADING article in our last issue described some recent investigations into the cause of dilatation of the ureters during pregnancy. It appears that Traut and McLane [1] have also been studying the tone of the ureters during pregnancy using, like Baird, a modification of the hydrophorograph originally introduced by Trattner.[2] Their conclusions agree with those of most other workers. They found a definite atony of the ureters, beginning in the third month of pregnancy and reaching its peak in the seventh and eighth months. During the last month there seemed to be a definite return of muscular irritability as expressed by peristalsis and response to stimulation. They ascribe the dilatation of the ureters partly to the pressure of the gravid uterus and partly to this atony, which they believe to be due to some hormonic factor.

## VITAL STATISTICS FOR 1935

THE Registrar-General has issued a provisional statement of the figures for birth-rate, death-rate, and infant mortality for the year 1935.

| — | Birth-rate. | Death-rate. | Infant mortality-rate. |
|---|---|---|---|
| England and Wales .. | 14·7 | 11·7 | 57 |
| 121 county boroughs and great towns, including London .. | 14·8 | 11·8 | 62 |
| 140 smaller towns .. | 15·1 | 11·4 | 55 |
| London (administrative county) .. .. | 13·1 | 11·3 | 58 |

The smaller towns are those with estimated resident population of 25,000–50,000 at the 1931 census. The birth- and death-rates for England and Wales as a whole are calculated on the estimated mid-1935 population, but those for the towns aggregates and for London are calculated on the estimated mid-1934 populations. The birth-rate is based on live births, the death-rate on crude deaths.

The birth-rate for 1935 is 0·1 per thousand below that of 1934 and is 0·3 above that of 1933, the lowest recorded. The crude death-rate is also 0·1 below that of 1934, the only years with a lower or similar record

[1] Traut H. F., and McLane, C. M.: Surg., Gyn., and Obst., January, 1936, p. 65.
[2] Trattner, H. R.: Jour. of Urol., 1932, xxviii., 1.

being 1923 (11·6), 1926 (11·6), 1928 (11·7), and 1930 (11·4). The infant mortality-rate is the lowest recorded, the previous record years being 1934 (59) and 1930 (60). The rates are provisional and are issued for the information of medical officers of health, but they are not likely to require substantial modification.

## TUBERCULOSIS IN HOSPITAL EMPLOYEES

THE investigations of Scheel and Heimbeck at the Ullevaal Hospital in Oslo have stimulated statistical investigation in other hospitals whose employees have shown a disquieting tendency to develop tuberculosis. The latest report [1] on this subject comes from the tuberculosis hospital of Söderby, Stockholm. Its medical superintendent, Dr. A. Gullbring, has found that between 1918 and the middle of 1935 there have been 45 cases of tuberculosis developing in a staff of 2016—an incidence of 2·2 per cent. While this rate was 2·6 per cent. (40 out of 1525 persons) among the staff in direct contact with patients, it was only 1 per cent. (5 out of 491 persons) among the administrative staff. Since 1928 new members of the hospital staff have been tested with tuberculin (Mantoux's test), and 20 per cent. of the 484 persons thus examined have been found to be tuberculin-negative. All the negative reactors tested at a later date showed a positive reaction. Of the tuberculin-tested employees, 19, or 3·9 per cent., have since developed tuberculosis, including only one belonging to the administrative staff. A comparison of the originally tuberculin-negative employees with the originally tuberculin-positive employees showed that the subsequent tuberculosis-incidence was 8·4 per cent. among the former and 2·8 per cent. among the latter—an observation confirmatory of the Scheel and Heimbeck teaching that the tuberculin-negative probationer is much more likely to develop tuberculosis. It may be noted in passing that in another Swedish hospital, the Serafimer Lasaret, the practice has now been adopted of inoculating with B C G those of the hospital staff who are found to be tuberculin-negative. Valuable data should, therefore, soon be available wherewith to control the claims made on behalf of B C G inoculation of tuberculin-negative nurses by the authors of the Ullevaal experiment.

## RUDYARD KIPLING

RUDYARD KIPLING was in every sense of the word a patriot; all classes of society from the highest to the lowest recognised his deep devotion to our country and admired his heartfelt expressions thereof. That some could not go the whole way with him proves the difficulty that will arise always when the claims of fervent nationalism clash with the international spirit; but pause to any criticism is given here in Kipling's case by the tributes to his genius and to his fiery love of humanity paid by the press of the civilised world. Where Kipling will stand in the estimates of an extended future no one can say exactly, but he must long remain a great figure. And this position has been definitely allotted to him by the decision that he should be buried in the Poets' Corner of Westminster Abbey. Kipling was passionately poetical while replete with exact knowledge of many material things; he was deeply moving and quite slangy; he was a master of the English language and original, even unprincipled, in his use of it; he was a brilliant story-teller, the most widely read poet of his day, and unsurpassed as a journalist.

It is fitting to record from his own lips his attitude towards medicine. In an address delivered to the students of Middlesex Hospital the following passage occurs: "Every sane human being is agreed that this long-drawn fight for time which we call Life is one of the most important things in the world. It follows therefore, that you, who control and oversee this fight and you who will reinforce it, must be amongst the most important people in the world. . . . In all times of flood, fire, famine, plague, pestilence, battle, murder, or sudden death, it will be required of you that you report for duty at once, go on duty at once, and remain on duty until your strength fails you or your conscience relieves you, whichever may be the longer period. This is your position. These are some of your obligations. I do not think they will grow any lighter." On another occasion, addressing the guests at a Hunterian banquet at the Royal College of Surgeons of England, he said: "Your dread art demands the instant, impersonal vision which in one breath, one beat of the pulse, can automatically dismiss every preconceived idea and impression, and as automatically recognise, accept and overcome whatever of new and unsuspected menace may have slid into the light beneath your steadfast hand. But such virtue is not reached or maintained except by a life's labour, a life's single-minded devotion." It was thoroughly characteristic of Kipling that the main thing which impressed him in the life of those who follow the calling of medicine was the claim made at all times and all places for the discharge of duty, for over and over again in prose and verse Kipling delighted to draw and extol the virtues of selflessness and resolution.

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IT is fitting for members of the medical profession, who know from experience the keen anxiety attached to the care of a patient whose cardiac reserve is slight and whose duties are onerous, to voice the gratitude of the Empire to Lord Dawson of Penn, on whom for eight years a heavy burden has fallen. It must have been due in no small part to his constant unobtrusive watchfulness as well as to his clinical wisdom that these years were for King George years of joyous fulfilment.

THE official proclamation of King Edward VIII. was made on Wednesday morning in pursuance with the Order in Council and in accordance with precedent. The proclamation was first read by Garter Principal King of Arms at the balcony in Friary Court, St. James's Palace, when a procession was formed and, flanked by the Royal Horse Guards, moved by way of the Mall and the Admiralty Arch to Charing Cross where the proclamation was again read by Lancaster Herald. On the site of Temple Bar a barrier marked the boundary of the City of London and at the corner of Chancery-lane the proclamation was read for the third time after formal admission to the City with the Lord Mayor in attendance. The procession then proceeded to the Royal Exchange where the proclamation was read for the fourth and last time.

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KENT COUNTY OPHTHALMIC AND AURAL HOSPITAL. The extensions to this hospital, which was founded at Maidstone in 1847, are being opened to-day, Jan. 24th. A debt of £10,000 on the new aural wing which was opened in 1930 has still not been cleared and the hospital now carries a total debt of £15,000.

[1] Nordisk Medicinsk Tidskrift, Jan. 4th, 1936, p. 14.

## THE KING'S LAST ILLNESS

*The following statement is based on authority :—*

"THOUGH it is understood that for some weeks His Majesty KING GEORGE'S health had not been altogether satisfactory the KING was able to go out and in fact rode on his pony for a short time on Wednesday, January 15th. On Thursday, the 16th, the KING showed signs of a mild catarrh which soon began to abate. The 'disquiet' expressed in the bulletins of Friday and Saturday arose from evidences of cardiac insufficiency. The margin of cardiac reserve has in recent days been narrowing. This illness therefore arose from within and was in the nature of a culmination. It was thus not comparable to the invading streptococcal septicæmia localising at the base of the right lung from which KING GEORGE suffered eight years ago. It is true that that illness placed heavy burdens on the heart which may have had a causal relationship to this last illness. It is a remarkable achievement that KING GEORGE recovered from septicæmia and reigned over his Empire seven years through times which have been eventful and sometimes anxious.

"This last illness showed that the body carried through its work till its powers were ended and then came to rest after an illness short, and peaceful in its close."

HIS MAJESTY KING GEORGE V. BEING RECEIVED BY SIR AUSTEN CHAMBERLAIN, CHAIRMAN OF THE GOVERNING BODY, ON THE OCCASION OF THE OPENING OF THE BRITISH POSTGRADUATE MEDICAL SCHOOL ON MAY 13TH, 1935.

# PROGNOSIS

*A Series of Signed Articles contributed by invitation*

## LXXXV.—THE PROGNOSIS IN DEAFNESS

### II

(*Concluded from p. 160*)

### Otosclerosis

THERE remains for consideration among the varieties of deafness attributable to lesions in the middle ear the important group of cases classed as otosclerosis; this is more common in females, is frequently hereditary, and is characterised by formation of new bone on the inner tympanic wall occluding the fenestræ, and, clinically, by the signs of middle-ear deafness with, at first, a strongly negative Rinné, good or increased bone-conduction, and marked loss of low tones, with a normal drum and Eustachian tube. Later there is often degeneration of the internal ear, but these patients, like other sufferers from middle-ear disease, rarely become completely deaf. Here, too, progress is not downwards along an even slope, but there are long stationary periods, often with a step down as the result of an illness, and sometimes an improvement with betterment of the general health. It happens not infrequently that otosclerosis is associated with some degree of chronic catarrhal otitis; in these cases attention to the hygiene of the nose, throat, and Eustachian tubes may be expected to give some improvement of hearing. Pregnancy has a peculiarly bad effect; although the hearing tends to improve again after delivery, it usually remains at a lower level than before, and it is sometimes advisable to induce abortion. Many forms of treatment have been tried and abandoned. A few otologists recommend a method of treatment by sonorous vibrations, introduced by Zünd-Burguet, in this affection as well as in chronic catarrhal otitis, but the results appear to be evanescent, and it has not been generally adopted. The late Dr. Albert Gray has employed weekly injections of thyroxine through the membrane into the tympanum with some encouraging results. Of surgical measures one, which holds out a faint hope for the future treatment of otosclerosis and of severe fibrotic occlusion of the fenestræ, consists in opening the bony labyrinth at the external semicircular canal, or in the region of the fenestræ, and covering the fenestration so made with a thin graft. In this way the hearing has certainly been improved, but there has been much tendency to relapse, due probably to the difficulty of keeping the opening patent and the graft from becoming rigid. Perhaps more lasting results may be obtainable by modification of the technique, but it must at present be acknowledged that no treatment has as yet any proved and lasting effect on the progress of this disease.

### Nerve-deafness

This includes deafness caused by lesions of the labyrinth, the auditory nerve, or the nerve-paths to the brain, and is irremediable in a large proportion of cases, though not in all. Certain *drugs* cause deafness of this type; of these quinine and salicylates are the most important, and cause tinnitus at the same time. The hearing recovers when the drugs are withdrawn, but permanent impairment may follow continued large doses of quinine. Lead, mercury, and carbon disulphide may all produce deafness, while excessive use of alcohol and tobacco have a deleterious effect. Many instances of severe deafness following the administration of the salvarsan group of drugs have been recorded; when syphilitic nerve-deafness is present salvarsan should be withheld until it has responded to mercurials. *Syphilis* causes nerve-deafness by affecting the cochlea and auditory nerve, and by producing basal meningitis; it may appear as early as the secondary lesions or as late as the development of tabetic symptoms. Improvement may follow early and thorough treatment, but often the disease progresses rapidly, and sometimes to complete loss of hearing; congenital syphilis is one of the commoner causes of deaf-mutism. *Epidemic cerebro-spinal meningitis* is accompanied by nerve-deafness with a frequency which varies in different epidemics from 4 to 30 per cent. and is a common cause of deaf-mutism; it is usually permanent but occasionally the patient recovers. *Toxic deafness* is common in enteric fever, but disappears during convalescence. Nerve-deafness is a rare complication of mumps; it is complete and incurable but, fortunately, usually unilateral. Measles, also, beside causing the common middle-ear infections, is an occasional cause of incurable bilateral nerve-deafness, probably of meningitic origin. Myxœdema has a bad effect on the hearing; any form of deafness in patients with hypothyroidism may be improved by thyroid extract. The patient with deafness resulting from traumatic *concussion* frequently recovers within a few days or weeks, but any impairment remaining after that time is likely to continue. The deafness due to fracture of the base of the skull is, of course, permanent.

*Occupational deafness* from prolonged exposure to noise is common in certain callings, such as riveting or machine-gunning; when established, it tends slowly to advance in spite of removal from the cause, and is only curable by change of occupation at an early stage. The single loud sound of an exploding shell was a frequent cause of deafness during the late war; improvement usually occurred during the first few weeks but some degree of deafness often remained. Allied to this is the condition called "*shell-shock*" *deafness*, the victim having been in action or buried by an explosion and becoming and remaining totally deaf. Probably he will have been deafened by labyrinthine concussion which recovered, but a psychic deafness persists. In such cases the hearing can be restored by appropriate psychiatric treatment, but it is difficult to distinguish sufferers from psychic deafness from those who have received organic damage of the cochlea. It is usually held that there is a probability of a physical lesion if the vestibular reactions are greatly diminished, but that the deafness is functional when these are approximately normal. True *hysterical deafness* is uncommon; it may be suspected when responses to testing are anomalous and, though it is curable, it may prove very obstinate. *Senile deafness* is a degeneration of the internal ear, characterised by relatively greater loss of the high notes, and of sharp sounds, such as the tick of a watch, compared with the continuous tone of a tuning-fork; it may begin prematurely at any age over fifty, especially in males. All deafness in old people is not, however, necessarily due to their age; they may suffer, like others, from cerumen or Eustachian catarrh, amenable to treatment.

### Hearing Aids

Hearing aids have a bearing on prognosis in that they make conversation possible for many sufferers

from advanced deafness. Those with middle-ear deafness can aiways be helped by such means so long as secondary degeneration of the cochlea is not serious; hearing aids are therefore most useful to patients with middle-ear deafness, especially otosclerosis, who have good bone-conduction, and for them the more recently introduced electric aids with bone-conduction receivers are particularly suitable. It is generally possible to tell these patients that they will remain able to hear conversation by means of a suitable apparatus. On the other hand, severe tinnitus is apt to be made worse by the use of electric aids, and these are in general less suited to patients with senile deafness than is some form of trumpet or, for the severest forms, the old-fashioned conversation-tube.

HAROLD BARWELL, M.B., F.R.C.S.,
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# SPECIAL ARTICLES

## TRACHOMATOUS CONJUNCTIVITIS
### ITS SURGERY AND PATHOLOGY*

BY A. F. MACCALLAN, C.B.E., M.D. Camb., F.R.C.S. Eng.
PRESIDENT OF THE INTERNATIONAL ORGANIZATION AGAINST TRACHOMA; OPHTHALMIC SURGEON IN CHARGE OF OUT-PATIENTS, WESTMINSTER HOSPITAL

DURING the last thirty years trachoma has become a comparatively rare disease in London. Ophthalmologists can realise with difficulty that the stigmata of the disease are borne by as many as half the inhabitants of the globe. For it is practically universal among the Mongolian and Semitic races, and among the Red Indian tribes; it is also widely spread among the Caucasians of India, and among the Malayans. Nevertheless, our knowledge of the ætiology of trachoma is incomplete; the clinical diagnosis may be impossible in the absence of bulky and expensive apparatus, and no aids are to be obtained by means of chemical or microscopical tests; while the treatment has not improved during the last thirty years.

### Pathological Anatomy

The response to attack by the virus of trachoma is a generalised flooding of the subepithelial tissue of the conjunctiva with lymphocytic cells. Typically, there are in addition special aggregations of these cells, which have been called follicles; however, in some cases no such follicles are to be differentiated from the general exudate of lymphocytes (Mikhail). The follicles, when present, differ in no way from similar aggregations of cells which appear in the condition known as follicular conjunctivitis. The conjunctival epithelium first proliferates, and then becomes villous; or it ulcerates and becomes replaced by scar-tissue epithelium.

The numerous underlying sebaceous or meibomian glands are at first affected by simple blockage of ducts and dilatation, the result of pressure by the cellular infiltration. Later the ducts become strangulated by the developing connective tissue, which begins to take the place of the lymphocytic exudate. The result is the appearance on the surface of the conjunctiva of numerous bleb-like excrescences, which burst on pressure, giving vent to gelatinous matter, the retained secretion of the sebaceous glands, with numerous cells. These bleb-like excrescences by all trachomatologists up to the present time have been looked upon as the follicles, described above, which have become dilated. There is no evidence that such dilatation occurs, nor has anyone ever observed such a phenomenon to develop. It would be impossible for such a metamorphosis of the follicles to occur. Mikhail also has observed the dilatations of the ducts of the meibomian glands, but has not connected them with the bleb-like excrescences of the second stage of trachoma.

The whole process, for the description of which I am indebted to Pulvertaft, is a chronic progressive inflammatory change, almost certainly due to a secondary infection of the subepithelial tissues, following a primary epithelial lesion. The difference between other forms of conjunctivitis and trachoma is that the effect of the virus is much more lasting in trachoma, leading to this enormous subepithelial exudate, which penetrates to the tarsus, and via the fornical conjunctiva to the upper corneal limbus. The natural end of this severe exudate is its transformation into cicatricial tissue, thereby differentiating trachoma from other forms of conjunctivitis. The involvement of the tarsus in the cellular exudate, and the subsequent cicatrisation which occurs, leads to thickening of this boat-shaped structure, and so to entropion. The trichiasis which accompanies the entropion is due to the development of supernumerary lashes by offshoots from existing hair follicles. This new development is caused by the hyperæmic condition of the lid margin which always occurs in serious cases of trachoma.

The hypertrophy of the superficial conjunctival epithelium leads to the appearance of numerous polygonal areas, which form a papillary hypertrophy. This is the result of irritation and is present in all forms of long-continued inflammation of the conjunctiva.

#### PANNUS

The term pannus was originally applied to the cloth-like opacity which the cornea of an inveterate case of trachoma exhibited. Completely ignorant of the pathology of the disease the surgeons of a former day used to attempt its removal. We now understand the term pannus to apply to an infiltration of the clear cornea by a cellular exudate, which is accompanied by the vascularisation of a previously avascular tissue. This may be observable only by optical magnification, or may be obvious to the naked eye. Following the primary epithelial lesion of the conjunctiva by the trachoma virus, whatever its nature may be, there is an infection of the subepithelial tissues to which response is made by a widespread inflammatory exudation. This spreads from the site of origin, near the retrotarsal fold, to the fornix, travelling beneath the epithelium, and from the fornix proceeds to the upper part of the limbus of the cornea. In this area pannus appears, which in early trachoma is the only pathognomonic sign of the disease.

Mikhail has made it quite clear that the changes at the upper corneal limbus occur in this way, and

* Abstract of a Hunterian lecture delivered at the Royal College of Surgeons of England on Jan. 17th, 1936.

that the limbus does not become infected from the trachomatous conjunctiva of the upper lid by contact.

The cellular invasion of the cornea has spread in the subepithelial tissue from the fornix. An increased vascularity is the response to this irritation. From the convexity of the end capillary loops of the cornea new vessels are developed which run centripetally towards the centre of the cornea with few anastomoses.

The cellular invasion appears first as an indefinite grey infiltration at the limbus, which often becomes concentrated into a number of tiny grey elevations. These are about 0·2 or 0·4 mm. in diameter. They are separated from one another by the new vascular channels just described. This cellular infiltration accompanied by new vessels inserts itself between the corneal epithelium and Bowman's membrane. In severe cases Bowman's membrane may become partially destroyed, when the infiltration will penetrate between the layers of the corneal stroma. Marked opacity is thus produced, which becomes permanent on conversion of the inflammatory exudate into cicatricial tissue. The folly of an attempt "to cure pannus" by peritomy or other ill-conceived measures, therefore, becomes apparent.

Four main points are of importance in our conception of the disease and in its diagnosis.

(1) The primary epithelial lesion caused by the virus results in an inflammatory reaction in the subepithelial tissue, exhibited by a lymphocytic infiltration. The lymphocytes may be aggregated into follicles, but this is not always the case. When such follicles are present they cannot be distinguished pathologically from similar aggregations of cells which occur in follicular conjunctivitis.

(2) This lymphocytic invasion of the subepithelial tissue spreads from its area of inception in the tarsal conjunctiva to the upper fornix, and thence in the bulbar conjunctiva to the corneal limbus, where changes occur peculiar to trachoma.

(3) The bleb-like excrescences, which exude a gelatinous material when ruptured, have no relation to the so-called trachoma follicles of an earlier stage of the disease.

(4) The lymphocytic invasion of the subepithelial tissue penetrates the tarsus, and finally is resolved into connective tissue. Hence result the deformities of the lids which occur in no other form of conjunctivitis.

The last three points differentiate trachoma from any other form of conjunctivitis.

## Clinical Manifestations

In heavily trachomatised countries such as Tunisia, Egypt, and Palestine, the disease is frequently discovered during the course of, or during convalescence from, an attack of acute bacterial conjunctivitis. But, as Charles Nicolle has said, the acute conjunctivitis is the occasion of the diagnosis, and not the occasion of the disease. The majority of the inhabitants of these countries become infected during the first two years of life. Born of trachomatous mothers, and suckled for nearly two years, it can be only by a miracle that infection will be avoided.

Typically the disease begins imperceptibly. Atypically and rarely it begins with acute symptoms such as pain, lacrymation, and photophobia, in the absence of bacterial infection. But these acute symptoms appear when the disease has already developed, as the result of roughnesses of the upper palpebral conjunctiva, which cause irritation of the corneal nerves. So this is an exacerbation of an existing condition, and not an acute onset. We can now enunciate a definition of trachoma.

*Trachoma is a specific contagious disease of the conjunctiva in man. It is chronic in nature. It is characterised by a subepithelial infiltration of the conjunctiva by a cellular exudate, which spreads to the tarsus and to the cornea. It is followed by cicatricial changes in the affected tissues.*

### FOUR STAGES

The disease is divided into four stages, according to the comparative prominence of subepithelial lymphoid infiltration, bleb-like excrescences which burst on pressure, papillary hypertrophy, and connective tissue formation.

(I.) After an incubation period of from 4 to 10 days, the first stage makes its appearance by a subepithelial infiltration. This infiltration is usually, but not always, concentrated into tiny greyish islets, the so-called follicles; these form slight roughnesses, and first appear at the extremities of the tarsal conjunctiva at its upper border.

The virulence of the trachoma virus is such that the subepithelial infiltration rapidly extends to the conjunctival fornix, and from thence to the upper corneal limbus. Pannus is present as soon as the condition can be diagnosed; in fact the diagnosis rests on detecting pannus with the corneal microscope.

(II.) The second stage has been divided into subgroups for application to different clinical appearances which are common in the East. For present purposes only one need be mentioned. Here there are numerous bleb-like excrescences, which rupture on pressure, with emission of gelatinous material. These are dilated ducts of sebaceous or meibomian glands. They have no relation to the tiny follicles of the first stage.

(III.) The third stage shows the resolution of the inflammatory infiltration commencing and its replacement by scar-tissue. Typically there are islands of inflamed conjunctiva surrounded by a cicatricial network. There is always some thickening of the tarsus by inflammatory products, often leading to entropion.

(IV.) In the fourth stage all inflammatory changes have come to an end. The tarsus is covered by scar-tissue epithelium and there is more or less cicatricial change in the thin subepithelial tissue and in the tarsus.

### ÆTIOLOGY

Now that the interest in the organism discovered by Noguchi, and reported by him as the causative agent of trachoma, has entirely evaporated, we are left with a theory that the disease is caused by a virus, and has some relation with certain inclusions in epithelial cells. These inclusions were first described by Prowaczek and Halberstaedter, who made experimental investigations in Java. They are not peculiar to trachoma, but are found in other ocular diseases, such as non-gonococcal ophthalmia neonatorum, follicular conjunctivitis, and swimming-bath conjunctivitis. They are indistinguishable from those found in certain known virus diseases, such as vaccinia, fowl-pox, varicella, herpes, and psittacosis.

## Principles of Treatment

It must be understood that the disease is a local one, confined to the eyelids and the cornea; that it confers no immunity until the normal epithelium has been replaced by scar-tissue epithelium; and that it produces no recognisable blood-reactions. The result of the action of the trachoma virus is an infiltration of the conjunctiva and cornea with lymphocytic cells. This is a manifestation of the defensive mechanism of the body tissues and fluids; the question immediately arises as to the utility of attempting to destroy this phenomenon, for no chemical or biological agent has been shown to have any neutralising effect on the activity of the disease.

It is in the first stage of the disease that these

doubts assail our minds. In the second stage, with its bleb-like excrescences, it is clearly necessary, by mechanical means, to get rid of the retained secretion in the blocked ducts of the meibomian glands. In the third stage the application of irritants, such as copper sulphate, is supposed to favour the deposition of fibrous tissue, at the expense of the lymphocytic infiltration.

A distinction must be drawn between "mass" and "individual" treatment.

Mass treatment at a clinic, where the actual manipulation of the lids is entrusted to nurses, is unsatisfactory; it is doubtful if it is preferable to the daily instillation of antiseptic or astringent drops by the patient himself. Individual daily treatment by an experienced ophthalmologist gives a better result, with the minimum amount of cicatrisation.

The principal sequelæ of trachoma are trichiasis and trichiasis-entropion. Some of the operations, which have been proposed to rectify the condition, should never be performed: such as Burow's operation, which is usually followed by a recurrence; Gaillard's sutures, which depend on suppuration for their effect; and Flarer's operation, or scalping of the lid margin, which results in permanent misery for the patient, for the lash-less lids roll in, and become macerated by the conjunctival secretion. The principles which should govern operations are:

(1) The epilation of lashes should be strictly forbidden.

(2) The eyelid should not be fixed in a clamp for operative purposes, but should be stretched on a metal shoehorn.

(3) No skin should be removed from the lid.

The operations to be recommended are Streatfield's operation in which a horizontal wedge-shaped strip of the tarsus is removed from its anterior surface, and Van Millingen's operation in which a mucous membrane graft is inserted in the free border of the lid posterior to the lashes.

### Prophylaxis

In Egypt, Tunisia, Syria, and India the employment of native nurses for European children entails severe risk of trachomatous infection. In the annual report of the Public Health Commissioner with the Government of India for 1933, it is stated that at King George's Royal Indian Military School, Ajmer, the trachomatous boys have not been segregated from their healthy comrades during the last years on the advice of the Poona ophthalmologist. The report goes on to state that no new cases of trachoma have been reported as the result of this measure. This sounds satisfactory; however, as there is no information as to whether the trachomatous boys had regular daily treatment applied to their eyelids, for the purpose of preventing infection, it is not convincing. To be so it would be necessary to have a record of the corneal microscopy of all supposed healthy boys.

If at a private school or at the house of a public school, where a son of mine was attending as a boarder, it came to my knowledge that a boy with active trachoma was admitted, I should at once remove my son. I have seen a boy infected with trachoma at a day school for English boys in one of the Crown colonies. I have also seen the serjeant-major of a territorial regiment become infected after a period of duty with an Indian regiment.

I wish to acknowledge indispensable assistance from Prof. de Grosz (Budapest), Prof. Panico (Rome), Drs. Pulvertaft and Waller (Westminster Hospital), Dr. Wilson and Major Stewart (Egypt), Dr. Rau, and Mr. Sorsby.

## BACTERIOLOGICAL GRADING OF MILK

THE results of an inquiry into the validity of the methods available for the bacteriological grading of milk have appeared this week in the form of a report to the Medical Research Council.[1] The objects of the investigation, which has occupied Prof. G. S. Wilson and his assistants at the London School of Hygiene and Tropical Medicine for three years, were these:

(1) To provide experimental data for conclusions as to the relative value and precision of the procedures current in the bacteriological testing of milk.

(2) To define a simple test by which the grading of milk in terms of its content in living bacteria can be reliably performed.

Both these purposes have been successfully fulfilled. The two methods hitherto mainly used for milk grading—viz., the plate count and the coliform count—have neither of them proved entirely suitable. Both have a large experimental error, and the plate count besides being complex and expensive gives an appearance of accuracy which is entirely fictitious and misleading. The coliform count, well adapted for the examination of water, has not justified itself in the examination of milk. But the methylene-blue reaction test, as modified by Prof. Wilson and his staff, has been found to be a satisfactory means whereby the milk of all producers can be regularly and frequently examined. In its earlier form this test was not adapted for the examination of milk of a high degree of cleanliness; it could only pick out very dirty samples. The modified test removes this objection; it is simple, inexpensive, and accompanied by only a very small experimental error. The general conclusions reached in the inquiry are conveniently summarised at the end of the report.

### Quality and Interpretation

Quality is a composite, not a single, attribute of milk. It comprises, amongst others, such various properties as the nutritive value, the cleanliness, the keeping quality, the pasteurisability, and the freedom of the milk from pathogenic organisms—i.e., its safety. The conclusions in this report refer solely to the bacteriological methods available for assessing the cleanliness and keeping quality of milk. The question of its safety is not discussed.

Interpretation of the results of any test for cleanliness of production depends to a considerable extent on the conditions of sampling. Instead of examining samples at any time after production of the milk, it is recommended that all samples should be kept at atmospheric temperature for a given time after milking, and then examined either immediately or after refrigeration overnight. The suggestion is made that samples of evening's milk should be left for 18 hours, and of morning's milk for 12 hours, at atmospheric temperature before examination. In this way the milk of all producers in any given area will be subjected to approximately the same temperature conditions for the same length of time.

With regard to the actual collection, great difficulties attend the obtaining of a really representative sample from most types of milk, and too great care

[1] The Bacteriological Grading of Milk. A Critical Study by Prof. G. S. Wilson, M.D., F.R.C.P., assisted by R. S. Twigg, R. C. Wright, Catherine B. Hendry, M. Penelope Cowell, and Irene Maier. Special Report Series No. 206. London: H.M. Stationery Office. 1935. Pp. 392. 7s. 6d.

cannot therefore be exercised in endeavouring to achieve this end.

## General Principles of Bacteriological Grading

Since the taking of representative samples is difficult, since the results of any one sample are affected largely by the time-temperature conditions under which it is taken and held, and since atmospheric temperature plays a very important part in determining the number of bacteria present, it is concluded that the cleanliness of the milk of any given producer should be judged, not on the basis of one or two samples taken at some particular season, but on samples taken frequently and regularly throughout the year. Whatever test is used, separate standards should be laid down for summer and winter, and penalisation should not be practised so long as a given proportion of samples, such as 75 per cent., conform to these standards. What is required, therefore, for the routine bacteriological grading of milk is a simple inexpensive test, with a small experimental error, which can be used on a large scale by relatively unskilled workers.

Bearing these general principles in mind, it is concluded that, though undoubtedly of use for certain special purposes, neither the sediment test, the leucocyte count, the titratable acidity, the H-ion concentration, the increase in acidity, the bromthymol blue test, the keeping quality test, nor the laboratory pasteurisation test can be regarded as suitable for the routine grading of milk.

### THE COLIFORM TEST

None of the three premises on which the use of this test for the control of water-supplies is based holds good for milk. With the possible exception of its employment on empirical grounds for Certified milk, there seems, therefore, to be no justification for the use of either the coliform test or the *coli-aerogenes* ratio test in the grading of raw milk.

For pasteurised milk, on the other hand, the coliform test may be of same value. It may serve as an index of the efficiency of the processing, if performed on freshly pasteurised milk, or as an index of the subsequent contamination or exposure to unsuitable temperatures, if performed on the bottled milk at the time of delivery to the consumer. The experimental error of the test is, however, very large, and on this account the results should preferably be reported, not in absolute numbers, but as above or below an arbitrary standard.

### THE BREED SMEAR METHOD

This method has not received in this country the attention it deserves. It is in the rapid grading of milk that the method finds its greatest value. There is no other test that enables a differentiation between clean and dirty milks to be made so rapidly—within a few minutes—and the test is, therefore, of inestimable service at collecting stations where milk from individual farms is bulked preparatory to dispatch to the large towns in rail or road tanks. The test is of considerable assistance to farm inspectors and agricultural advisers, because it so frequently enables a distinction to be drawn between the various faults of production to which any given milk is subject. It can be used as a control to the plate count, or as a substitute for it. As a general test, however, for the routine examination of large numbers of milks, the Breed smear method is, we believe, less suitable than the modified methylene-blue reduction test that we have described.

### THE PLATE COUNT TEST

Ostensibly this test measures the numbers of bacteria in milk, but in fact it does not. On account of the difference between various species of bacteria in their nutritional, respiratory, and temperature requirements, on account of the fact that many organisms may be dead, and most important of all on account of the gross irregularity in the distribution and clumping of the organisms in the milk, the plate count merely registers the number of bacterial units capable of multiplying under the particular conditions selected. Since the average number of bacteria per clump is variable from one milk to another, and from time to time in the same milk, and since these clumps may disintegrate to a quite uncontrollable extent during the process of dilution, it follows that the figures yielded by the plate count are arbitrary, not strictly comparable from milk to milk, merely approximate, and have no real significance.

The technique is complex, is difficult to standardise, and requires highly skilled workers. Even under favourable conditions, with the method standardised as far as possible, the experimental error is very large, and on any one count an allowance of $\pm$ 90 per cent. may have to be made. Even this margin of error will not include all results. Besides demanding costly apparatus and a delay of at least two days in the result, the plate count seems to afford no better index of the sanitary conditions of production or of the keeping quality of the milk than the Breed test or the modified methylene-blue test. It is therefore recommended that the plate count test should be discontinued as a method of grading ordinary raw milk. Even for Certified milk it seems to have no advantage over the modified methylene-blue reduction test.

The quantitative expression of the results in figures extending over a wide range affords a fictitious appearance of accuracy which leads, not only in laymen, but even in public heath officials, to a wholly unjustifiable feeling of confidence in their value. If the plate count is to be used, it should be permitted only on one condition—namely, that the results are reported not in quantitative terms, which are often grossly misleading, but as above or below an arbitrary standard.

For pasteurised milk, with the possible exception of Grade A pasteurised, the plate count is not recommended. The actual count on pasteurised milk is determined by so many factors independent of the efficiency of the processing that the results bear little relation to any important quality of the milk.

### THE MODIFIED METHYLENE-BLUE REDUCTION TEST

This test seems to fulfil most of the requirements demanded of a test for the routine grading of raw milk. It is a simple inexpensive test, with a very small experimental error, which can be carried out by relatively unskilled workers on large numbers of samples, which demands a minimum of equipment, which can classify milk on the basis of cleanliness into the maximum number of grades desirable, and which affords on the whole a very good index of the keeping quality of the milk. Besides these advantages, it gives more information about the milk than does the plate count. The result does not appear to be seriously affected by the degree of aggregation of the organisms in the milk, and the test is a very much more sensitive index than the plate count of bacterial growth. By the use of the modified methylene-blue reduction test it should be possible to examine the milk of every farmer at weekly or fortnightly intervals throughout the year at a cost only a fraction of that of the plate count.

Whether the test is suitable for the examination of freshly pasteurised milk is doubtful, but there is reason to believe that it could well replace the plate count on bottled samples delivered to the consumer.

## Recommendation

Whatever test is used, the report recommends that no attempt should be made to divide milk into more than three or four classes. The numbers and activity of micro-organisms in milk are determined by so many different factors that the establishment of numerous subdivisions is not only meaningless, but may be definitely misleading. From the public health point of view probably only two divisions need be made on the basis of cleanliness—namely, into (*a*) milk that is suitable and (*b*) milk that is not suitable for human consumption in the liquid state.

After consultation with the Ministry of Health the Medical Research Council has accepted Prof. Wilson's report as a statement of the scientific evidence on which possible administrative action may be based.

## MORTALITY FROM PHTHISIS IN YOUNG ADULTS

### A STATISTICAL STUDY

THE Registrar-General's mortality statistics for recent years have revealed an unfavourable trend in the death-rate from respiratory tuberculosis at young adult ages. In the enormous decline that took place in the death-rate from this cause during the latter half of the nineteenth century young adults had their full share, or even somewhat more than their full share. But between 1901–10 and 1930 the mortality at these ages has declined amongst males at a slower rate than is apparent in any other age-group, while amongst females there has actually been a slight rise in mortality at ages 15–25, and at ages 25–35 the decline has been appreciably less than that observed in any other age-group. Division of England and Wales into its administrative areas shows that it is in the highly urbanised areas that this unfavourable change is most apparent.

The basic figures illustrating this trend were set out in a paper read before the Royal Statistical Society on Jan. 21st by Mr. A. Bradford Hill, D.Sc., in which the author discussed various explanations of the present position. Some workers—e.g., F. J. H. Coutts—believe that the prodigious fall in the general death-rate from tuberculosis has led to a much lower level of infection in early life and this to a decline of immunisation in childhood, with the result that more persons must face the hazards of adolescent life with no acquired immunity. A more frequently accepted explanation attributes the relatively high mortality, especially of young adult females, to the entry of such persons into the "strain and stress of competitive wage earning," with the associated changes in their social life. Dr. Hill is unable to find much statistical support for either of these two hypotheses. Taking the death-rate from tuberculosis at ages 0–5 as a measure of the pressure of infection in childhood, he finds that the course of this death-rate in a group of English counties is not related to changes in the mortality experienced at young adult ages in later years. Similarly, towns with a high death-rate from tuberculosis at ages 0–5 do not appear to have a lower phthisis death-rate in young adult life fifteen to twenty years later than towns with a relatively low death-rate in childhood—general health factors being as far as possible equalised. With regard to occupational changes Dr. Hill shows first that in towns where the death-rate of young adult females has shown the greatest increase, there has been, on the average, a tendency for the rate of young adult males to increase also, or to show a slower rate of decline than in other towns. Where the female rate has declined substantially the male rate has also, on the average, declined substantially. Dr. Hill argues that this relationship implies a causal factor common to both sexes and suggests that the occupational changes in female life are therefore unlikely to be more than a partial explanation. He finds no correlation between changes in the *volume* of female employment over the years 1911 to 1931 and changes in the phthisis death-rate of young adult females in the county boroughs. The changes in *type* of employment evident in recent years are more difficult to measure but the evidence available does not implicate such changes as a responsible agent.

Failing to find support for these explanations Dr. Hill turns his attention to the question of internal migration and the consequent distribution of young adults in different parts of the country. In past years one striking aspect of the phthisis mortality of young adults in this country has been the *higher* death-rates registered in the rural areas as compared with the urban areas, a phenomenon observed only at these ages. In an investigation carried out by the author some years ago,[1] he concluded that the explanation of this position lay in the migration of young adults from the country to the town, and that the migrants form a physically select group, which strengthens the town population at young adult ages and leaves a physically weaker residue behind. It follows that changes in the volume of this migration would be expected to produce changes in the regional distribution of the phthisis death-rate. In fact, in recent years the excess mortality at the young adult ages in the rural areas has completely disappeared. At the same time the loss of population in the rural areas has turned to a gain. The rural exodus slackened at about the turn of the century, while, in addition, the population of many rural areas may have changed in type due to the improved methods of transport enabling persons to reside in such areas and work elsewhere. Similarly the migrants to towns may have changed in type—for instance, it appears that London tends now to recruit young adults from the depressed areas rather than from the rural areas. Are these changes in the movement of population related to the changes in the phthisis death-rate? Dr. Hill finds that, to some extent, they are. Those county boroughs which have attracted young adults have, on the average, shown a declining death-rate from phthisis in young adult life during the past decade, while those that have lost population have tended to show a rising death-rate. This association might, the author suggests, be due to the fact that towns that have ceased to attract population are in a less satisfactory economic position than those that still recruit young adults, and this lower economic level is reflected in their death-rates. Alternatively it may be that, in towns that are no longer recruiting physically fit young adults from the rural districts, the death-rate is now measured upon a physically different population from that of past years. The towns are no longer strengthened, or are less strengthened, by this selective recruitment, the rural areas are less depleted.

Naturally, as we are dealing with a general phenomenon, Dr. Hill does not put this forward as being more than a contributory factor. In the recently issued text volume of the Registrar-General's Statistical Review for 1933, attention is directed to the association of increasing mortality at young adult ages with unfavourable housing standards.

"Grouping together areas with over 1 per room average density, phthisis mortality of females aged 15–25 increased from 1911 to 1930–32 by 25 per cent. in the county boroughs and 21 per cent. in the counties, whilst in London with a mean density about 1 per room it increased by 16 per cent. At densities of 0·85–1 per room the towns showed no change and the counties an increase of

[1] Med. Research Coun., Spec. Rep. Series No. 95, London, 1925.

15 per cent., but at densities below 0·85 per room both showed improvement of the order of 20 per cent. On the other hand, at ages 25–45, the fall in mortality was not confined to the better housed areas, but occurred almost irrespective of density."

It will be realised that the problem is intricate and its solution involves, as a first step, the clear presentation and careful analysis of statistical data. Dr. Hill's paper is a model of such work and will be indispensable in further study.

## THE ARMY IN 1934

THE Report [1] of the Director-General of Army Medical Services for 1934 makes cheerful reading. Soldiering in that year was an even healthier occupation than in 1932, previously a record year. The ratio of admissions to hospital fell to 402·6 per thousand compared with 412·5 per thousand in 1932, and there were appreciable reductions in the death, invaliding, and constantly sick ratios. The most notable decrease in disease was that of the malaria-rate in India which fell to 67·5 per thousand.

Among officers the admission-rate was 191, a slight increase on 1932. The most important causes of illness were, in order, inflammation of areolar tissues and tonsils, fractures, dysentery, malaria, influenza, and appendicitis. The principal causes of admission to hospital were the same for the soldier as for the officer, except that for the soldier venereal disease appears in the third place while dysentery and appendicitis were less common than sprains, contusions, and inflammations of the upper respiratory tract. Bacillary dysentery is now about five times as frequent as amœbic—a marked contrast to the position ten years ago. Treatment is very satisfactory; only three patients were invalided from the Service during the year. There has been a striking decrease in the enteric group of fevers, especially in India. Arrangements are being made to extend protective inoculation to children, among whom the incidence is still too high. Improved figures in India are also responsible for a general reduction in sand-fly fever. There has been a general decrease in venereal disease, except in Jamaica. Work on the treatment of gonorrhœa tends towards substituting saline irrigation fluids for potassium permanganate. Specific infectious fevers were rather bad during 1934 and there were three deaths from diphtheria and two from scarlet fever. General immunisation of children at Blackdown may have accounted for the complete absence of diphtheria on that station, and vigorous steps are being taken to spread this form of protection. The large increase of cerebro-spinal meningitis in the Indian civil population has not so far affected the troops. There was a high incidence of middle-ear disease in Jamaica, Malaya, and Egypt, probably associated with the fact that bathing is a chief recreation in these places. The reduction of tonsillitis is deemed to be of the utmost importance because heart disease of rheumatic origin is the cause of much wastage.

There has been a steady increase during the past 11 years in gastric and duodenal ulceration, and a smaller increase of appendicitis. The figures are believed to depend on improved diagnosis rather than on any real increase. There has been no change in the standard diet, but the ætiological factor of dental sepsis is under increasingly better control. Young unmarried soldiers with ulcers which relapse twice after adequate medical treatment are being recommended for discharge. It is felt that young soldiers are liable at any time to military duties which may, and often do, nullify in a few days the results of the most careful treatment. Few of the factors important in maintaining freedom from ulceration are within the control of the individual soldiers themselves. While the best possible diet and cooking are provided, the men cannot always be kept from sudden exposure to fatigue or inclement weather or obtain, out of hospital, frequent regular meals specially adapted to their needs. Married non-commissioned officers of long service suffering from ulcer are, if possible, retained and the commissioned officers—apart from mobilisation or prolonged manœuvres—are in a more hopeful position.

The typhus group of fevers is attracting special attention abroad and evidence is accumulating to show that in India there are several hitherto unrecognised sub-groups with differing serological attributes.

### SURGERY

There was an increase in the number of surgical operations performed during the year, the total being 9157, with a mortality-rate of 0·54 per cent. This includes pensioners and women and children. The chief facts that stand out from the Report are the importance of local injuries and diseases of the areolar tissues—notably boils and carbuncles. The latter are treated conservatively with magnesium sulphate compresses rather than by active interference. There is also a tendency to give up open operations on fractures and to rely more on skeletal traction by wire or pins. Local anæsthetics are more widely used for setting fractures. The use of spinal anæsthetics and Evipan is on the increase, although inhalants are still by far the most popular. The commonest major operations, apart from hernia, appendicitis, and ulcer, were cholecystectomy and for intestinal obstruction. There were 349 operations for recent inguinal hernia and 8 for femoral hernia. Injuries of the knee-joint played a fairly large part in disability and in 36 cases the fluid was aspirated; the time spent in hospital was considerably less than if the cases were treated by elastic pressure and conservative measures. "Out-patients" forms a very important part of the work of the surgical specialist, and clinics for the injection treatment of varicose veins and hæmorrhoids continue to be of great value. There has been a large increase in the work of radiological, massage, and electrotherapeutic departments.

### WOMEN AND CHILDREN

There was an average strength of 18,508 women for which the Army Medical Department provided services during 1934, and of these over 3000 were admitted to hospital during the year. The principal causes of admission were abortion, cramp and spurious labour pains, malaria, and appendicitis, followed in frequency by inflammation of the tonsils, bronchi, and areolar tissue. In addition, 2660 women were admitted to hospital for confinement and 13,845 received out-patient treatment. Of the 29,521 children on the roll there were just over 5000 admissions to hospital and 26,847 out-patients. The principal causes of admission were enlargement of the tonsils, scarlet fever, inflammation of bronchi and tonsils, pneumonia and measles, dysentery, diarrhœa, malaria, and inflammation of areolar tissue. The wives and children are not entitled to medical

[1] Report on the Health of the Army, 1934. H.M. Stationery Office. Vol. lxx. Pp. 165. 3s.

attendance at public expense but are eligible for it under certain conditions. Military family hospitals are established at stations where the strength of the garrison is out of proportion to that of the civil population. All these hospitals have antenatal clinics and during 1934 more than 300 expectant mothers were admitted for observation and treatment. The percentage of abnormal labours was very small; the morbidity-rate was less than 8 per cent. and the mortality-rate 0·3 per cent. Authority is being sought for the extension of facilities for dental work by the Army Dental Service to all expectant mothers. An increasing interest is being taken in mother and child welfare, and accommodation is becoming cramped, but neither authority nor funds exist at present for new construction.

The Report emphasises the immense value of the work of the nurses of the Soldiers', Sailors', and Airmen's Families' Association. As an example, in Egypt seven nurses are employed, and they paid just under 40,000 visits during the year and gave an average of 514 hours' work each to welfare centres and medical inspection rooms. During the autumn a general supply of milk was instituted for children attending army schools in the Southern Command. Unfortunately there was some doubt for a time whether the Milk Marketing Board's scheme was applicable to army schools, but the hope is expressed that it will soon be possible to continue the sale of milk at reduced rates. In the Aldershot Command a manufacturing firm has offered to supply a third of a pint of malted milk for each child at a cost of 3*d*. a week. Fresh milk-supplies remain variable and only partly under control.

Most barracks in Egypt are very heavily infested with bugs, and an experimental disinfestation with hydrocyanic gas proved to be extremely satisfactory.

Research work has been continued on the effects of a new type of deep breathing exercises on the vital capacity of the lungs. The average gains of platoons on these exercises was 130 c.cm. greater than the gain of those on ordinary exercises. The research department of the Directorate of Pathology has been concerned with the production of a better typhoid vaccine. The demonstration that a typhoid septicæmia could be induced in mice, which could also be rendered more or less immune by vaccination, offered a new avenue of approach to the problem. It was found possible to enhance the virulence of different strains and the corresponding vaccine by continued and rapid animal passage. A similar procedure was followed for the paratyphoid organism, and it is confidently expected that vaccines prepared from the highly virulent cultures will be as superior in human prophylaxis as they are for laboratory animals; they were first used just before the trooping season of the year under review. Although inoculation is entirely voluntary, 98 per cent. of the troops availed themselves of it. Children from the age of 2 years upward tolerate the vaccine well.

The rate of rejection of the troops was nearly 40 per thousand lower than in 1932–33. It is hoped in future to maintain statistical records of those rejected at sight by the recruiting staff without medical examination, in order to obtain a true picture of the physical state of the youth of the nation. In the London zone it is known that 1749 were rejected for obvious physical defects, making a percentage of 67·2. Of those medically examined, the figure for the whole army is 35·7 per cent. rejected for medical reasons. The total would therefore appear to be approximately 50 per cent. of those applying.

## MEDICINE AND THE LAW

### Lightning and Workmen's Compensation

THE risks of injury due to the weather have raised interesting questions under the Workmen's Compensation Acts. If the workman is to recover compensation, his injury must have arisen not only in the course of his employment but also out of his employment. To be struck by lightning while at work is an injury arising in the course of the employment; it is not necessarily an injury arising out of the employment. The leading authorities include cases of bricklayers struck by lightning when on a high scaffolding, or sailors affected by heatstroke while painting the ironwork of a ship in the heat of a tropical sun. A recent decision in the Bath county court illustrates the legal issue. A workman died while employed on the Bath corporation's housing estate where a trench was being dug for the laying of iron water-pipes. On June 25th there was a violent thunderstorm and work proceeded at intervals. The dead man had a steel shovel with a wooden handle in his hand and was stooping to throw soil forward, with the shovel slightly raised. A second man was similarly employed within a few inches of him; a third was a few feet away. A wooden wheelbarrow was a few yards off; it had a steel rim to the wheel. Suddenly the deceased was thrown on to his back on the ground; there was a loud clap of thunder and a vivid flash; a neighbouring workman complained of shock. The county court judge was offered a large body of scientific evidence as to the effect of the wheelbarrow, the shovel, the pipe line, and the stacked pipes. He rejected this evidence as largely speculative and partly incredible. He came to the conclusion that the deceased, who had been badly burned, was directly struck by the lightning and that the electric discharge had not been attracted or conducted by the metal objects named. The parties agreed that the court had to decide whether the deceased, by reason of his occupation, was subject to a greater risk than usual. The judge found that there was nothing in the man's employment which added to the risk of his being struck. The deceased was in no greater peril that any other inhabitant in the city of Bath or immediate neighbourhood. The court was satisfied that the lightning which killed the workman had no kind of connexion, direct or indirect, with his employment. There was thus an award for the respondents, the Bath corporation, with costs. It is a pity that the experts' evidence was not more fully reported. What, one wonders, are the professional qualifications most acceptable to a court in expert witnesses who are to deal with the effects of lightning?

### "Running Amok" with a Car

The unsuccessful appeal in R. *v.* Mortimer, against a conviction for murder, disclosed strange facts and a neat point of criminal law. The accused stole a car at Aldershot and, next day, drove it along a lane where two sisters were riding their bicycles in single file ahead of him. Approaching them from behind, the car struck the rearmost cyclist and carried her and her bicycle along the road for about 30 yards on the bonnet. The woman then fell to the ground, dying later of her injuries, and the car drove on and disappeared.

In ordinary human affairs knowledge of a man's previous conduct and character is the first thing taken into account. If money has been stolen in

an office, a business man would at once suspect that a clerk who had been previously convicted of larceny had been the thief. The law carefully excludes such extraneous considerations. If a man is charged with theft, the prosecution is not entitled to offer evidence (except in certain carefully restricted contingencies) that the accused stole something else on some date earlier or later. One of the grounds for offering evidence of similar offences is the existence of a need to negative the idea of accident. In Mortimer's case the prosecution, having to prove that he intended either to kill or to cause grievous bodily harm, obtained permission at the trial to give evidence of three similar occurrences (two earlier, and one later, than the event which formed the subject of the present charge) in order to establish the intent and to negative the possibility that the event was an accident. The Court of Criminal Appeal decided on Jan. 13th that this parallel evidence was rightly admitted.

The defence in a case of this kind is naturally at a disadvantage if it takes two different lines. Mortimer's counsel relied on certain discrepancies in the evidence as to the number of the car and the clothing worn by the appellant. It would probably occur to the average reader to say that a man must be mad who acts as Mortimer was proved to have acted. Insanity was not pleaded, but it remains to be seen whether this may not be one of the cases where the accused, though deemed sane enough to be convicted of murder, is deemed not sane enough to be hanged.

### Marriage of Girl under 16

One of the first cases under the Age of Marriage Act, 1929, was heard in the Probate, Divorce and Admiralty Division last week. A woman who was married on Sept. 27th, 1930, after giving her age in the marriage register as 17, now petitioned for a declaration that the marriage was null and void because she was in fact one month short of 16 years of age at the time. The court granted the declaration invalidating the marriage.

### Food Preservative Prosecution

Three companies were fined last week at Tower Bridge Police-court, on proceedings at the instance of the Bermondsey borough council, for the sale of "Drywite Potato Preparation" in contravention of the Public Health (Preservatives, &c., in Food) Regulations. The proceedings raised the issue whether the language of the label would be likely to lead to an offence inasmuch as the preparation contained sulphur dioxide. It was stated that the label made reference to the washing but not to the cooking of fish; the preparation was described as a powerful deodorant. Experiments were said to have shown that, if fish were fried after treatment with the preparation, or were washed whole, no sulphur dioxide was found; but that when fillets of cod were washed in the preparation and analysed without cooking sulphur dioxide was revealed in minute quantities. The significance of the matter, it was suggested, lay not in the quantity of the preservative but in the fact that its use might lead to the consumption of unwholesome fish, since the preparation was capable of masking the evidence of putrefaction by removing smell or otherwise. For the defendant companies it was admitted that, in view of the statements made by the prosecution, the label might lead to the sale of uncooked fish containing prohibited preservative. A formal plea of guilty was entered and the companies undertook to discontinue the use of the offending label. Fines were inflicted with costs. A further summons for failure to label the preparation as prescribed by the regulations was not separately dealt with; this part of the case related to the allegation that the declaration of the contents of the preparation was printed in type of smaller size than prescribed.

## SCOTLAND

(FROM OUR OWN CORRESPONDENT)

### X RAY EXAMINATION OF THE GASTRO-INTESTINAL TRACT

Dr. Robert McWhirter, who was recently appointed radiologist to Edinburgh Royal Infirmary, read a paper to the Medico-Chirurgical Society of Edinburgh last week on the examination of the gastro-intestinal tract by radiology. He said that while in the early days of X raying the stomach only gross lesions were detected, modern apparatus and technique have enabled a very high degree of accuracy to be obtained in the diagnosis of diseases of the stomach and duodenum. The figures from the Mayo Clinic suggest that the degree of accuracy should be over 95 per cent.; this, however, is only possible with careful preparation of the patient and modern apparatus. While some radiologists like to have a full clinical history of the case before examination, Dr. McWhirter holds that no case notes should be supplied to the radiologist, in order that he may not be prejudiced by a clinical history. He proceeded to describe conditions of the œsophagus, stomach, and duodenum which can be diagnosed by X ray examination. In diseases of the stomach the preparation of the patient is simple but very important. No fluid or food should be given from 10 P.M. the night before examination. No purgatives are necessary. It should be possible, he said, to detect an ulcer crater the size of a pin-head and a carcinoma the size of a thumb-nail. Clinicians do not fully appreciate the fact that the diagnosis of diseases of the stomach and duodenum is made by screen examination alone and films are taken only for record purposes. The study of the mucous membrane pattern is of special importance in the detection of early diseases of the stomach. The presence of a residue in the barium in the stomach five hours after administration is often of no pathological significance. The diagnosis of pyloric stenosis can be made in five minutes on screen examination. In cases of duodenal ulcer the finding of the actual ulcer crater is always evidence of active ulceration; when only ulcer deformity is present the appearance may be due entirely to a healed ulcer. Dr. McWhirter went on to say that in his opinion the diagnosis of chronic appendicitis by radiology was impossible, and that a large amount of time and money was uselessly expended in attempting to demonstrate chronic diseases of the appendix. After considering the diagnosis of diseases of the large intestine and emphasising the importance of careful preparation for this examination, Dr. McWhirter referred to the examination of the gall-bladder by X rays. He said that intravenous injection of the dye used was no longer necessary, and emphasised the fact that the administration of the fatty meal was not to demonstrate the contractility but to make more obvious negative shadows within the gall-bladder. Dr. McWhirter's communication was illustrated by beautiful X ray photographs.

### A PHYSIOLOGIST ON MEDICAL EDUCATION

Prof. E. W. H. Cruickshank, who has been appointed to the Chair of Physiology in Aberdeen University, delivered last week his inaugural lecture entitled Some Views on Medical Education. He said that the first purpose of medical education was to turn out men well equipped in the art and practice of medicine in all its phases; and the second was to discover and train men in creative work. He emphasised the need for general cultural education as an introduction to medical studies. The rigid lecture system had led to the evil of elaborate note-taking by the students and should as far as possible be replaced by the conference method, which, if carried out in small groups, was valuable in training the student in critical inquiry and in arriving at reasoned conclusions.

### THE "OPEN-DOOR" POLICY

The abuse of the "open-door" policy has led the Board of the Royal Infirmary, Glasgow, to make use of its almoner's department for the purpose of giving patients who are able to pay the opportunity of contributing to the cost of their treatment. In so doing they are taking the step which the other large voluntary hospitals in Scotland will probably have to follow before long. The steady increase in the work done by the voluntary hospitals and the fact that all classes are going to make use of the treatment and advice that can be obtained in these hospitals will, in all probability, oblige them to make a charge to those who are able to pay.

## UNITED STATES OF AMERICA

(FROM AN OCCASIONAL CORRESPONDENT)

### CONTROL OF PATENT MEDICINES

THE seventy-fourth Congress now reassembling after its vacation has before it no less than nine bills for the better regulation of the manufacture, advertisement, and sale of foods, drugs, therapeutic devices, and cosmetics. The most important of these is Senate Bill No. 5 introduced by Senator Copeland, of New York, who is a physician. This is described as—

> "An Act to prevent the adulteration, misbranding and false advertising of food, drugs, devices and cosmetics in interstate, foreign and other commerce subject to the jurisdiction of the United States, for the purposes of safeguarding the public health, preventing deceit upon the purchasing public and for other purposes."

The bill has been critically analysed by the Bureau of Legal Medicine of the American Medical Association, who find that "there is grave danger of the enactment of an inadequate law—one that will not protect the consumer adequately, that will require expensive and prolonged litigation before it can be effectively enforced, and that may for another quarter century or more exclude from the statute books an effective law." The influence of the lobbies representing the cults is very obvious, and may well serve as a horrible example to English legislators. Thus "Drugs" as defined in the Copeland bill are so defined specifically for the purposes of this act and "not for the regulation of the legalised practice of the healing art." Why on earth not? one might reasonably ask. The only possible answer seems to be that certain State laws allow chiropractors to make adjustments but not to use drugs. Somebody seems to have been afraid that the Copeland bill by its definition of drugs might help to convict a chiropractor of using drugs contrary to the statute of his particular State. The answer to the question When is a drug not a drug? will no doubt contribute to the cost of the "expensive litigation" referred to by the committee.

Again, "medical opinion" is defined as "the opinion within their respective fields of any branch of the medical profession the practice of which is licensed by law . . ." and the term "medical profession" means, despite appearances, "the legalised professions of the healing art." What becomes, then, of the bill's prohibition of false advertisements, seeing that the advertiser has adequate defence if only he can show that his statements are supported by "substantial and reliable medical opinion"? Presumably most juries will accept as such opinion, and will be instructed to accept it, the evidence of any half a dozen naturopaths. These and other weaknesses in the descriptive provisions of the bill are not offset by any rigidity in the provisions for enforcement. On the contrary the Secretary of Agriculture is expressingly excused from prosecuting any "minor violations" if he thinks a "written notice or warning" is to be preferred. Considering that no guidance is offered as to what constitutes a "major" and what a "minor" violation, and that in practice the decision of whether or not to prosecute will inevitably devolve upon subordinates, the weakness of this provision is apparent.

The analysis by the American Medical Association will serve a useful purpose if it leads to correspondence between individual doctors or local societies and their representatives in Congress. It has not received and is unlikely to receive any notice in the lay press. Discussion of the provisions of the bill controlling advertisement, and of their present weakness, is not likely to be favoured by the powerful advertising interests.

## BUDAPEST

(FROM OUR OWN CORRESPONDENT)

### UNEMPLOYED DOCTORS IN BARRACKS

AT the request of the National Committee for Unemployed Graduates, the Ministry of Defence has provided shelter and board for 100 of these men, most of them doctors. They live in a vacant military barracks, in dormitories of 5–15 beds, with no other furniture than a long trestle table and benches and chairs. Clothes and linen are kept in bags, and shelves for books have been placed over some of the beds by the men themselves. Here they live in true good fellowship, without jealousy or discontent, and the only disputes are on scientific subjects. They themselves arrange the day's routine and discipline, which are scrupulously observed. In the morning after breakfast they scatter through the city in search of work. At noon they return to the barracks and after a simple meal they do domestic work. Needle and thread are taken out, and the hands trained to do operations now display great skill in repairing a solution of continuity in coat, shirt, or trousers. Some, lacking means to pay the shoemakers, show themselves able to sole and heel their boots. After further search for work they return early in the evening, having no money to spend in clubs, cafés, or music-halls. In this way the days and weeks are passed until some fortunate runs in, joyfully shouting that he has found a post as an assistant or parish doctor or in the health

insurance service. Hurriedly packing his bag he leaves his place to another of the unemployed, of whom the numbers are woefully great. There are no complaints, despite the contrast of barrack room and military food with their hopes when they qualified—hopes of appointments, assured status, marriage, and family life. Most of them are young and expect sooner or later to get work and realise their dreams; the barrack-room life is only a transitory stage and in the end the majority find satisfactory work.

THE ELDERLY PRIMIPARA

During the past 24 years Dr. Stephan Sztehlo, of the School of Midwifery here, has personally observed 5588 deliveries of primiparæ and has now reviewed them in order to determine the effect of age on labour. His findings agree with the general opinion of obstetricians that the influence of age is considerable. After thirty, a first labour is likely to be more troublesome, and one must be prepared for complications—especially in women who have become pregnant for the first time after many years of married life. The risk of long labours, inertia, post-maturity, hæmorrhage, and puerperal sepsis increases with the age of the patient, and from the point of view of pregnancy and labour, he thinks, the most favourable age for labour is 20–24 years.

A RHEUMATISM LIBRARY

In 1926 at Pistany, the thermal spa, the International League for the Campaign against Rheumatism was formed and it was then hoped that an international institute for research into muscular and articular rheumatism might be founded. A leading physician in the town has made plans for such an institute, and they have been approved by the Ministry of Public Health. A library is the first part of the scheme to be realised and building will begin in February. Its objects are to attract students to Pistany, to offer them facilities for studying the literature, and thus to help research workers in their investigations.

MEAT CONSUMPTION IN HUNGARY

An average of 116 lb. of meat per head was consumed in Hungary in 1934, a figure which cannot be considered low compared with those of other European States. Financial stress caused only a slight decrease in meat consumption because of a simultaneous fall in the price of food, and particularly of meat. As might perhaps be expected, more is eaten in Budapest than in the countryside. Owing to the relative cheapness of beef, veal, and mutton, very little horse-flesh is now eaten, though it was once considered a delicacy.

FREE MILK IN THE SCHOOLS

In the poorer parts of the capital the city council have introduced the free milk system and to every child about a third of a pint is distributed each day. A recent report of Dr. Endre Tudös, lecturer in the university, shows that this distribution has considerably improved the condition of delicate or anæmic children, and the teachers have noticed faster progress, keener attention, and quieter behaviour. The minister of education is accordingly anxious to introduce the system in rural districts, where children badly need wholesome milk because, owing to the economic crisis, the small farmers with a few cows sacrifice their own and their children's health by selling their entire stock of milk to the city.

# PUBLIC HEALTH

## Maternal Deaths in L.C.C. Hospitals

THE strenuous efforts to improve the L.C.C. maternity services have caused an increased demand for admission and a lowered death-rate affecting almost every group. Dr. Letitia Fairfield,[1] reporting for the year 1934, records a total of 13,253 births, an increase of 1336 on the previous year, and a mortality-rate of 5·1 per thousand. The antenatal care reaches a very high standard. The Council demands one special examination for all booked patients, but the great majority attend more or less regularly at borough clinics. The divided responsibility for maternal care has always created difficulties in London, but there has been a marked improvement in coöperation during the past year. One of the chief difficulties of the Council is congestion, for Wassermann tests are now made on all women attending for the first time, and many more blood pressures are now taken than in earlier days. These precautions are justified by a comparison of the death-rate of those attending L.C.C. clinics with others.

*Sepsis.*—The mortality figures for the Council's hospitals cannot be compared with the country generally because these institutions are the chief resort for cases of abortion, and they also receive an undue proportion of women suffering from general diseases. They show, however, that sepsis is the commonest single cause of death in the Council's wards, as elsewhere. Deaths from true uterine sepsis numbered 8 only (0·61 per thousand births), and of these only 5 were patients whose labour had been conducted entirely in the Council's hospital. If deaths after Cæsarean section and mastitis are included, the figure for 1934 is 1·18 per thousand births. There was nothing in the nature of an epidemic during the year, and in only one case of sepsis was there evidence of the source of infection, but the prevalence of mastitis in certain localities continues to give rise to anxiety. Certainly forceps do not appear to be the cause of sepsis in the Council's service. Dr. Fairfield thinks that one of the most important factors in the prevention of sepsis is the early detection and isolation of all cases of fever or other suspicious signs of early sepsis in a maternity ward. Improved accommodation is making this precaution possible in the Council's hospitals, with increasing success.

Apart from sepsis there were 4 "*accidents of childbirth*": 3 of the patients were admitted in extremis, one with a ruptured uterus and a shoulder presentation and two after "failed forceps." The fourth had had antenatal care from the Council and died from shock after craniotomy.

*Accidental hæmorrhage and placenta prævia.*—Of the 86 cases of accidental hæmorrhage admitted only 1 died, and she arrived moribund.

There were 98 cases of placenta prævia with 3 deaths, one from sepsis after several vaginal examinations made before admission. 13 Cæsarean sections were performed for placenta prævia without a death.

*Anæsthesia.*—There was 1 death attributable to anæsthesia: percaine and a gas, oxygen, and ether

[1] L.C.C. Annual Report of the Council, 1934. Vol. iv., Part III. Public Health. Medical Supplement to the Report on the Hospital Services, p. 88.

mixture. She died five minutes after induction began without warning, before the operation was started, and the heart muscle showed degeneration. Of the 13,061 women delivered 4424 were given light intermittent anæsthesia, mainly by chloroform capsules, 850 had a general anæsthetic, 58 had a local anæsthetic, and 325 had analgesia by drugs in combination with some form of anæsthetic. Analgesia without an anæsthetic was supplied to 837 patients.

*Cæsarean section* was performed on 136 patients with 9 deaths. In most cases the indication was contracted pelvis and disproportion, but heart disease, placenta prævia, and toxæmia played their part. The operation was performed before labour in 74 cases with 5 deaths, early in labour in 30 cases with 2 deaths, and late in labour in 32 cases with 2 deaths. Four of the deaths were entirely due to the condition for which the operation was performed and the remainder were due to sepsis. Of the first group, one had very severe heart disease, one fulminating acute yellow atrophy of the liver, the third had chorea gravidarum, and the fourth a large pyelonephrosis.

The large strides made in preventing *eclampsia* and *toxæmia* have caused these diseases to be regarded as an indicator of the efficiency of antenatal care. Dr. Fairfield thinks that the argument can be pushed too far as, on the one hand, the patient may fail to recognise early symptoms however carefully she is instructed, or, on the other hand, the disease may be of the rare fulminating type which resists all treatment and gives no warning. During the year 41 cases of eclampsia were admitted; 12 had had antenatal care in the Council's clinics and 2 of these died; 29 had had care from other sources (or none) and 6 of these died. The time at which the fits developed illustrates the grave prognostic significance when the first fit is post-partum. In 11 cases the fits began before labour and in 22 cases during labour, and in each group there were 2 deaths. In 8 cases they began after labour, and half these women died. It is clear that periodic urine testing would not always provide an adequate warning: one woman who died never had any albuminuria at all, and in some cases the urine had been tested only a few days before the fits began and had shown nothing abnormal. The blood pressure is a valuable but not an infallible guide to the imminence of danger. Only one woman with eclampsia had a pressure below 130. Above this critical figure, however, the readings had little prognostic significance, as patients with a maximum of 140 died while those with pressures of over 200 recovered.

Another group of deaths recorded is that *associated* with pregnancy and confinement; this includes every woman who died between the twenty-eighth week of pregnancy and four weeks after delivery. Some of the deaths were purely coincident, while in others childbearing played an obvious part. Dr. Fairfield points out that a quite extraneous cause such as an influenza epidemic might easily affect the maternal mortality-rate and create fallacious alarm, while over-careful certification might over-weight the figures. Instances have been known where a woman died from phthisis or heart disease weeks after childbirth and was classified as a "maternal" death.

Dr. Fairfield concludes by remarking that the close inquiries into every maternal death in the Council's hospitals show that no obvious or easily eliminated cause for a high mortality-rate exists. The only possibility of a further reduction lies in a steady improvement of staffing, accommodation, and organisation, together with loyal coöperation on the part of the patient.

## Speech Training and the C.A.M.W.

An increasing number of local education authorities have made provision for the treatment of stammering and other speech defects; at the present time 40 authorities provide classes which children attend for a period of about 50 minutes on two occasions per week, while 10 authorities provide classes where full-time attendance is arranged, but, as is pointed out in the C.M.O.'s recent report, many authorities still do not appreciate that inability to speak distinctly is an even greater reflection on the educational system than is failure to acquire the art of writing. The Central Association for Mental Welfare has, during recent years, arranged for an expert in speech-training to visit certain areas in order to investigate the problem of children with speech defects. Before her visit, ascertainment of the number of such children has been carried out by head teachers and the names of such children sent in to the education office. The speech expert, Miss Marion Fleming, has then examined the children in coöperation with the school medical officer, after which suitable children have been taught in classes arranged on the lines of those which are held in London. In addition to the actual training of children with stammering and other speech defects, Miss Fleming has lectured to teachers and others interested in the problem, given demonstration lessons before teachers from the contributory schools, and she has also paid a number of home visits.

The school medical officer for Coventry has included in his annual report a statement by Miss Fleming of the incidence and histories of stammerers in the Coventry schools. In association with the assistant school medical officer information relating to 158 stammering children was obtained, and the following conclusions were arrived at:—

1. Of the stammerers investigated, 62 per cent. were either the eldest or the eldest but one in the family, while 21·5 per cent. were the youngest members of their respective families; in the larger families containing stammerers, therefore, the incidence of stammering appears to be least among "middle" children.

2. In about one-quarter of the cases, either the father or the mother was also a stammerer.

3. It appears that there is no notable connexion between "left-handedness" and stammering.

4. As expected, findings indicating stammering as a functional nervous disorder were numerous; among them 75 per cent. of the cases were noted as being nervous and "highly-strung"; 22 per cent. of the cases were nail-biters; 62 per cent. of the cases were said to speak more easily at home than at school.

5. In most cases, the cause of the stammer was not evident. The findings under the headings of causation are hardly compatible in some directions with findings under other headings. For instance, "imitation of others" is given as the cause in but 5·7 per cent. of cases, whereas stammering in one or other of the parents, which is likely to elicit imitative response in the child, is recorded as occurring in as many as 22·7 per cent. of the cases investigated.

Miss Fleming only remained for a period of from six weeks to two months in the area. This time, as she points out, is too short for definite results to be obtained in the treatment of stammerers. The great advantage of the arrangement, however, is that local interest was aroused, and in more than one of the areas which she visited it is proposed to appoint a whole-time teacher for children with stammering and speech defects.

# CORRESPONDENCE

## CONTROL OF MEASLES

*To the Editor of* THE LANCET

SIR,—Dr. J. D. Rolleston's historical résumé of the subject of the serum prophylaxis of measles in your last issue (p. 168) was of great interest. Stating that Dr. Brincker was incorrect in his belief that the first attempt to modify measles in this way was first made only 40 years ago he refers to Frances Home's pioneer work on this subject in 1765. He then states that Dr. Hugh Thompson, of Glasgow, employed this method successfully in two cases (1890). I was able to discuss this with the late Sir Leslie Mackenzie just before his death, and he then informed me that Thompson had subsequently published a considerably larger series of cases with similar results. I am unfortunately unable to find any reference to this series, and it would be of considerable interest to hear if any of your readers are able to give information with regard to this.

I believe that I am correct in saying with regard to the modern method of prophylaxis and attenuation of measles by means of convalescent serum that I was the first to introduce it to this country some years prior [1] to the epidemic of 1929–30 in which it was used with such success.

I am, Sir, yours faithfully,

Harley-street, W., Jan. 20th. W. S. C. COPEMAN.

## SYNTROPAN IN SEA-SICKNESS

*To the Editor of* THE LANCET

SIR,—May I draw your attention to the effectiveness of the new synthetic vagus depressor, Syntropan, in sea-sickness. As ship's surgeon travelling between Australia and London, and vice versa, during two very stormy periods, I have had some rather intensive experience. The first trip, homeward bound, in November-December, was made in a severe Mediterranean storm, and a severe Atlantic storm in which the wind reached gale force, as recorded in the ship's log, for the best part of ten days. Conditions aboard ship were at their worst, and most passengers were sick—some exceedingly sick. On the outward journey in July-August, the monsoon was at its height, a man being lost overboard from a sister ship passing us. There were seven days of bad weather and much sickness.

A total of 140 cases of sea-sickness was treated, 100 with Syntropan preparation No. 2190/14, and 40 with Vasano, and with the usual mixture of hyoscyamine and bromide. Syntropan and vasano were equally effective in removing almost instantly the feelings of nausea that precede the sickness. The hyoscyamus mixture was not so effective in ambulatory cases. When vasano was replaced by syntropan, the passengers thereafter preferred the syntropan preparation because it did not give rise to the intensely dry mouth which is also produced by hyoscyamus. Two tablets, morning and afternoon, served to cure the worst cases. The usual difficulty in dealing with patients unable to keep the tablets down was overcome by using suppositories of the same material. Passengers who were occasionally overcome, when given two tablets of the syntropan preparation, were almost immediately restored, so that the efficiency of the preparation became a subject of comment; one tablet sufficed in mild cases. Moreover, I cured a fellow officer, and myself, just as rapidly, by taking two tablets when the stage of real discomfort had been reached.

Why syntropan should act so effectively on the gastric vagus and have so little action on the salivary parasympathetic supply, is not at all clear; it may be a matter of differential rates of penetration of the drug into the neighbourhood of the various parasympathetic endings that is the explanation. The result, however, is remarkable, and anyone knowing the discomfort of the dry mouth produced by hyoscyamine will agree that a remedy so effective as that reported is indeed worthy of mention.

The composition of the preparation is as follows:—

| | | |
|---|---|---|
| Syntropan | .. .. | 0·01 g. |
| Sedormid | .. .. | 0·1 g. per tablet. |

syntropan being phosphate of the 3-diethylamino-2-2-dimethyl-propylester of tropic acid.

I am, Sir, yours faithfully,

C. STANTON HICKS,
Professor of Pharmacology and Human Physiology, University of Adelaide.

Nov. 6th, 1935.

## DR. ALBERT GRAY'S TECHNIQUE

*To the Editor of* THE LANCET

SIR,—May I in amplification of the account of Dr. Albert Gray's work contained in your obituary notice last week add something about the method of making transparencies of the membranous labyrinth which he devised and employed with such success in his work "The Labyrinth of Animals." This process yields at one stage perfect casts of the bony labyrinth, but the finished product is much more than a cast and contains all the structures of the membranous labyrinth, perfectly cleared and preserved. I am, Sir, yours faithfully,

C. S. HALLPIKE.

Ferens Institute of Otology, Middlesex Hospital Annexe, Jan. 20th.

## COLLAPSE THERAPY IN PLEURISY AND PNEUMONIA

*To the Editor of* THE LANCET

SIR,—I read with much interest the observations of Dr. C. Shaw in your issue of Dec. 7th, 1935 (p. 1280), on artificial pneumothorax for the relief of acute pleural pain. I made observations on 12 cases so treated (Calcutta Med. Jour., August, 1934) which did well and I remarked:

> "It was quite reasonable to think that it should be so, because the partial collapse of the lung at once stopped friction between the two inflamed layers of the pleura, gave rest to the diseased area, relieved local congestion and pain and hastened repair and convalescence. Further, by maintaining this state of partial collapse by giving more fillings afterwards, healing was perfect, and the chance of relapse or formation of adhesion or effusion was very much minimised. The author is in touch with some of these cases for over two years and they are keeping perfectly fit."

I read with equal interest Dr. W. E. Robertson's paper in the same issue of THE LANCET (p. 1282), for I had treated similarly 20 cases of pneumonia with excellent results—only 3 deaths—my main difficulty being to find a sufficient number of suitable cases.

Since the influenza pandemic of 1918–19, the infective organisms of acute catarrh of the respiratory

[1] Jour. of Hyg., 1925, xxiv., 427; Proc. Roy. Soc. Med. (Sec. Epidem.), 1927, xx., 1609.

tract are usually of mixed character, true lobar pneumonia, in Calcutta at least, being comparatively rare. The usual picture is one of acute bronchial catarrh, in some cases with patches of consolidation forming from day to day, which by fusion give rise to pseudo-lobar consolidation. In these cases as well as in true lobar cases A.P. treatment often gave a very favourable result. With Dr. Robertson I have found that (1) A.P. does confer almost instant relief upon those suffering from coincident pleuritis; (2) it ameliorates cough and expectoration; (3) it frequently lowers the temperature, sometimes to a surprising extent. Dr. Robertson thinks that it does not cut short the attack of pneumonia, but in my cases I found that A.P. treatment nearly always brought down the pulse and the respiratory rate, lessened toxæmia, and caused considerable improvement in general condition, thus shortening the course of the disease and reducing its mortality.

Specific treatment with Felton's serum is very expensive; typing is difficult, and once consolidation has been established serum is not so effective. In all late cases A.P. treatment is more suitable. Dr. Robertson has pointed out that it is innocent of any collateral ill-effects, to which I fully agree. Since 1932 in my wards in the Campbell Medical School and Medical College Hospitals it has been routine treatment to perform partial collapse in all cases of uncomplicated acute primary pleurisy and circumscribed lobar-like consolidation. The quantity of air introduced varies from 100 to 400 c.cm., depending mainly on the amount of pleural space available. In some cases one operation was sufficient but in others it had to be repeated, and in bilateral cases partial collapse was maintained on both sides.

I am, Sir, yours faithfully,

Calcutta, Jan. 2nd. A. R. MAJUMDER.

## ABDOMINAL VARICOSITIES

*To the Editor of* THE LANCET

SIR,—In your issue of Jan. 11th Mr. A. L. d'Abreu describes two cases of varicose veins of the legs which showed by the presence of abdominal varicosities that some obstruction was present in the deep veins of the trunk, and states that he regards the existence of the latter as prohibiting the treatment of the leg veins. His view, however, is not securely founded either on theory or fact. If the saphenous veins show a positive Trendelenburg test they can be safely treated whether the patient has obstruction of the vena cava or not. Some years ago I obliterated the varicose veins in the legs of a similar case with satisfactory results and showed the man before a society, not because I regarded the treatment as unusual, but because the deep obstruction in the abdomen appeared to be congenital. Further, it is held by some, including Dickson Wright (Brit. Med. Jour., 1931, ii., 561), that even when the obstruction is in the deep veins of the leg itself the superficial varicosities are merely an added embarrassment to the circulation, and I have treated several such cases without regret. It would, of course, be generally regarded as bad treatment to deal with the abdominal veins, but V. Meisen (Varicose Veins and Hæmorrhoids, London, 1932, p. 50) has done so in a case with deep abdominal thrombosis, and apparently without ill-effect, and with cure of the coincident eczema. It is a curious fact that these abdominal varicosities sometimes appear without any apparent cause for obstruction of the inferior vena cava or the iliac veins.—I am, Sir, yours faithfully,

Birmingham, Jan. 16th. J. W. RIDDOCH.

# THE SERVICES

### ROYAL NAVAL MEDICAL SERVICE

Surg. Comdrs. G. Kirker to *Drake* for R.M. Infirmary, Plymouth, and J. F. H. Gaussen to *Lucia*

Surg. Lt.-Cmdr. W. A. Hopkins to be Surg. Cmdr.

Surg. Lt.Cmdrs. J. C. Souter to *Drake* for R.N. Hospital, Plymouth, and A. M. Lawrence-Smith to *Victory* for R.N.B. and to *Dolphin*.

Surg. Lt.-Cmdr. (D.) L. M. Hughes to *Victory* for R.N.B.

Surg. Lts. H. G. Silvester to *Duncan*, A. E. Ginn to *Herald*, W. F. Viret to *Tern*, J. L. S. Steele-Perkins to *Sandwich*, and F. H. Lamb to *Folkestone*.

### ROYAL ARMY MEDICAL CORPS

Short Service Commissions: Lts. J. G. M. A. Brunet and R. O. A. Leroux to be Capts.

### ROYAL AIR FORCE

*Medical Branch.*—Wing Comdrs. P. T. Rutherford, O.B.E., to Headquarters, Fighting Area, Uxbridge, for duty as Principal Medical Officer, vice Group Captain K. Biggs, M.C., and E. C. K. H. Foreman to No. 10 Flying Training School, Ternhill, for duty as Medical Officer.

Squadron Leader C. A. Lindup to No. 8 Flying Training School, Montrose, for duty as Medical Officer.

*Dental Branch.*—Flying Officer Alexander Maben, L.D.S., is promoted to the rank of Flight Lt.

Flight Lts. Hugh Bannerman, F. W. P. Dixon, and C. R. Palfreyman have been selected for permanent commissions in the medical branch, subject to physical fitness; they entered as flying officers in 1930–32.

### INDIAN MEDICAL SERVICE

Lts. (on prob.) to be Capts. (on prob.): I. J. Franklen-Evans, J. Duffy, and K. Cunningham.

Lt.-Col. B. Higham, C.I.E., retires.

*Indian Medical Department.*—Maj. (Sen. Asst. Surg.) T. J. Gibson retires.

## INFECTIOUS DISEASE

IN ENGLAND AND WALES DURING THE WEEK ENDED JAN. 11TH, 1936

*Notifications.*—The following cases of infectious disease were notified during the week: Small-pox, 0; scarlet fever, 2397; diphtheria, 1264; enteric fever, 21; acute pneumonia (primary or influenzal), 1571; puerperal fever, 58; puerperal pyrexia, 117; cerebro-spinal fever, 23; acute poliomyelitis, 7; acute polio-encephalitis, 1; encephalitis lethargica, 7; dysentery, 21; ophthalmia neonatorum, 91. No case of cholera, plague, or typhus fever was notified during the week.

The number of cases in the Infectious Hospitals of the London County Council on Jan. 17th was 3850, which included: Scarlet fever, 1098; diphtheria, 1150; measles, 433; whooping-cough, 599; puerperal fever, 17 mothers (plus 11 babies); encephalitis lethargica, 280; poliomyelitis, 4. At St. Margaret's Hospital there were 18 babies (plus 8 mothers) with ophthalmia neonatorum.

*Deaths.*—In 121 great towns, including London, there was no death from small-pox, 1 (0) from enteric fever, 43 (4) from measles, 5 (0) from scarlet fever, 28 (5) from whooping-cough, 36 (7) from diphtheria, 44 (12) from diarrhœa and enteritis under two years, and 110 (18) from influenza. The figures in parentheses are those for London itself.

The mortality from influenza is the same as last week, the total deaths for the last six weeks (working backwards) being 110, 110, 80, 67, 62, 45. They are scattered over 56 great towns, Birmingham reporting 8, Oldham 5, Bradford and Newcastle-upon-Tyne each 4, Luton, Leeds, Sheffield, and Coventry each 3, no other great town more than 2. Liverpool and Manchester each had 9 deaths from measles, Bristol and Nottingham each 4. Liverpool also reported 8 deaths from whooping-cough. Deaths from diphtheria were reported from 18 great towns: Liverpool 4, Hull 3, Darlington, Sheffield, Warrington, and West Hartlepool each 2.

The number of stillbirths notified during the week was 246 (corresponding to a rate of 37 per 1000 total births), including 33 in London.

# OBITUARY

## ANDREW FRANCIS DIXON, M.B., B.Ch. Dub.

THE death occurred on Jan. 15th of Andrew Francis Dixon, professor of human anatomy and embryology in the University of Dublin. Born in 1868, he came of a well-known Dublin family. One of his brothers occupies the chair of botany in Dublin University and another until lately was professor of engineering in the City and Guilds College of Engineering, London, while his uncle, R. V. Dixon, was a fellow of Trinity College.

Francis Dixon entered Dublin University in 1885 and had a brilliant academical career, gaining a senior moderatorship and gold medal in natural science and securing many other distinctions, as well as obtaining in 1893 the medical degrees M.B., B.Ch., B.A.O. During the course of his medical studies he first came in contact with the late Prof. D. J. Cunningham who so greatly influenced his career. His early interests were in zoology and his first publications were concerned with the marine invertebrates, in which he was intensely interested all his life. But in 1893 his attention was turned more definitely towards human anatomy and he went to Leipzig to study under the late Prof. His. A year later he was appointed chief demonstrator in anatomy in Trinity College, Dublin, under Cunningham. In 1897 he was appointed professor of anatomy in University College, Cardiff, but in 1903 he returned to his old college to succeed Cunningham as professor of anatomy and chirurgery in the medical faculty, and from that date his whole-hearted service and loyalty were devoted to Trinity College. In 1916 he was appointed the representative of the college on the General Medical Council; in 1922 he was appointed to the newly founded chair of human anatomy and embryology, and in 1924 he became dean of the Faculty of Physic. And perhaps his greatest work was his devotion to the interests of the students and the ardour with which he worked for them, especially in their early post-graduate years. He was keenly interested in all their activities and took a very large part in organising the Trinity College Association with the object of keeping them in touch with each other and with their college. He was also actively interested in the old O.T.C. and in the Dublin University Biological Association, of which society he was president in 1904–05.

A. Francis Dixon

Outside the University Prof. Dixon had a very wide circle of friends and interests. He was a life-long member of the Anatomical Society of Great Britain and Ireland, and was elected president of that society in 1934. From 1917 to 1925 he was a member of the council of the Royal Dublin Society and in the latter year was appointed a governor of the society. On six separate occasions he was elected a member of the council of the Royal Irish Academy, and in 1919 and again in 1926–27 he was a vice-president. For thirty years he was a member of the council of the Royal Zoological Society of Ireland, and from 1927 to 1931 was their president. He was a fellow of the Royal Academy of Medicine in Ireland and in 1906–08 was president of the section of anatomy and physiology. In 1934 he was appointed warden of Alexandra College. His many personal friendships and his wide sympathies made him a very valuable link between the university and outside bodies.

In his younger days Dixon published many interesting contributions to anatomical science. Our knowledge of the development of the fifth cranial nerve, of the course of the taste fibres, of the structures in the female pelvis, and of many interesting features in the skeleton has been considerably extended by his researches. But in later years pressure of administrative duties and heavy responsibilities in directing the medical school necessarily curtailed his time for such work. But those who knew him realised that he possessed an amazing fund of original observations and accurate knowledge on many interesting points, and regretted that lack of time and his own modesty prevented him from committing them to print.

He will be remembered always as a very loyal and warm-hearted friend. His memory for faces was extraordinary, and Trinity men revisiting the college after a lapse of many years were always sure of a warm personal welcome from the dean. For the college itself he entertained such a loyal devotion that no task was either too large or too menial for him to undertake if he felt that its interests were concerned.

We have received from our Dublin correspondent the following estimate of Dixon's great services, not only to his University but to the scientific world:—

"For nearly half his life—thirty-two years—Francis Dixon was head of the department of anatomy in the School of Physic; for nineteen years he represented the University of Dublin on the General Council of Medical Education and Registration, and for eight years on the Irish Medical Registration Council; he represented the professors of the university on the board—the governing body—of Trinity College; he was for many years past dean of the School of Physic. It is clear that the character of the school during the last thirty years must have been largely influenced by him. It is difficult for any but his colleagues to realise how sound and constructive was that influence, and how kindly, wisely, and unselfishly it was exercised. With an essentially conservative outlook and with a firm confidence in the mode of education which was traditional in Dublin, he never ceased his determination to keep that education in touch with modern requirements. He insisted on his students learning their anatomy

soundly, but he never forgot that his first duty was to fit them for medical practice. At the same time any senior student or young medical man who desired to study anatomy more deeply or to investigate any particular problem of anatomy with a clinical bearing received every encouragement and facility. When he was appointed in 1903 to the chair he succeeded two great anatomists—Alexander Macalister and Daniel John Cunningham; in his hands the reputation of the school of anatomy, both as a teaching institution and as a centre of research, was not only maintained but increased. He contributed frequently to the various scientific journals, and he always had something solid to contribute. His publications were marked by clarity, precision, and modesty. His teaching of his anatomy class had the same characters, and he held the attention and roused the interest of his students without apparent effort. He contributed the section on urogenital anatomy to Cunningham's 'Text-book of Anatomy,' and gave much assistance to the editor in the production of the first edition. He also wrote a 'Manual of Human Osteology' which has become a favourite text-book in many schools. His chief interests in original work lay in the fields of embryology and comparative anatomy.

"His responsibility as dean of the school kept him in touch with the work of all his colleagues. His influence on them and their work was more that of an elder brother than of an official of the university. He never intruded and never interfered, but his advice and help were at the disposal of all of them, and it is only since his retirement that they realise how much they had come to rely on him. They knew that his advice would be wise, and would be given without any slightest touch of self-interest or self-seeking. A shy man and a modest, he never liked pressing his opinions on others, but nevertheless he held strongly to his own convictions, and when a difference of opinion occurred he stated his views clearly and tersely, and then left it to others to make their decision according to their conscience as he had made his.

"His relations with his pupils were of the happiest. He did not tolerate slackness and he insisted on a high standard of work, but it was only in the rarest cases that he adopted disciplinary measures. Many a respected and respectable practitioner, inclined in his youth to idleness or folly, can look back to the help and guidance of Dixon as one of the important influences in his career.

"Dixon's friends will remember with pride his honourable career, his achievements, his services to his University, and to medical education. Their pride will, however, be lost in their affection for the man, the wise counsellor, the trusty friend whose friendship never stood out so strong as in time of trouble or anxiety."

## JOHN BRIGHT BERRY, M.D. Edin.

Dr. John Berry, who died on Jan. 11th at the age of 79, was the doyen of the medical profession at Keighley. He graduated as M.B., C.M. Edin. in 1880, proceeding at a short interval to the M.D. degree. He practised for a time at Bradford, but some 40 years ago went to Keighley and pursued his vocation there until he retired in 1920. During a great part of his life in Keighley Dr. Berry held an honorary consulting position to the Victoria Hospital and he was closely connected with the Bradford Medico-Chirurgical Society of which he was past-president. He always showed himself a skilful and progressive surgeon and was the first man to excise a diseased joint at the Keighley Hospital, while it is a matter of interest that he should have attended Lister's last course of lectures in Edinburgh. A correspondent writes: "Dr. Berry was the real doctor, available to anyone at any time, fee or no fee, and many of the older generation in Keighley will remember him with feelings of real affection."

## STEWART RANKEN DOUGLAS, F.R.C.P. Lond., F.R.S.

DEPUTY DIRECTOR, NATIONAL INSTITUTE FOR MEDICAL RESEARCH, HAMPSTEAD

WE regret to announce the death of Captain S. R. Douglas, deputy director of the National Institute for Medical Research, Hampstead, and director of the department of experimental pathology, who died at his residence in Buckingham-gate, London, on Monday, Jan. 20th, at the age of 64.

Stewart Douglas was born at Coulsdon Grange, Caterham, in 1871, the son of the late Mr. J. A. Douglas. He was educated at Haileybury, and proceeded for his medical training to St. Bartholomew's Hospital. He qualified with the English double diploma in 1896 and entered the Indian Medical Service as a surgeon-lieutenant. He did good work quite early in his career under the Plague Commission, and served with the China Expedition in 1900–01, being promoted captain and receiving a medal for his services. After the expedition he was invalided home much broken in health, but he determined to return to work and pursue a career of medical research that had already deeply attracted him. At this period he came into a close association with Sir Almroth Wright at St. Mary's Hospital, and from 1907 for seven years was assistant director of the inoculation department at this hospital and a member of the medical staff of the institution as lecturer on bacteriology in the medical school. His status as a teaching pathologist was thus established. In 1903 he communicated to the Proceedings of the Royal Society in collaboration with Sir Almroth a paper on the experimental investigation of the rôle of the blood fluids in connexion with phagocytosis. In the next year followed further observations on the rôle of the blood fluids and a communication on the protective substances elaborated in the blood in response to inoculation with a tubercle vaccine. These papers were also read before the Royal Society, while he published in THE LANCET (this in association with Major F. W. Hardy) some valuable pathological observations on bilharzia diseases, and in 1907, also in THE LANCET, a report on infective endocarditis

CAPT. S. R. DOUGLAS

[Photograph by Elliott & Fry

cured by the inoculation of a vaccine prepared from organisms found in the patient's blood.

Thus at the outbreak of war Captain Douglas's scientific reputation was well established. On August 1st, 1914, he had been appointed to the bacteriological staff of the Medical Research Council but instead of taking up this work he took a commission in the R.A.M.C. and was for a time engaged in research work in France. But here the duties proved beyond his physical strength and he was soon invalided home, but only to continue his work enthusiastically. He was engaged in the laboratories of St. Mary's Hospital in organising the production of vaccines for the use of the troops and in making special researches on, among other things, infection in wounds and dysentery; for these valuable labours he was decorated and appointed also Chevalier de l'Ordre Couronne, Belgium.

In 1922 Douglas was elected F.R.S. and appointed director of the pathological department at the National Institute for Medical Research, later becoming deputy director of the institute.

In 1920 he married Frances, née Dayrell, widow of Dr. J. B. Nias, but leaves no children.

To the many who came into personal contact with him, as to ourselves, Douglas's genial manner, unvarying kindness, and aptitude for friendship made an appeal that will not be forgotten. In the tributes which follow these characteristics of the man are displayed.

Sir Henry Dale, Sec. R.S., writes:—

"The sudden news of the death of my staunch friend and dearly loved colleague S. R. Douglas reached me by cable while I was in Holland at the week-end. I had known and liked him at casual meetings for some years, before we became in 1914, just before the war, fellow members of the then newly appointed nucleus staff of the future National Institute for Medical Research. War activities separated us, and it was not till the institute begun its work at Hampstead, in 1920, that our intimate association began. Douglas was then acting director of the institute's largest department, dealing with bacteriology and experimental pathology, and was made full director of it a year or two later; Leonard Hill, John Brownlee, and I directing the other three departments, as originally conceived. Brownlee's death, and Hill's retirement by seniority some years ago, had left Douglas and myself the only remaining members here of the original staff. The organisation of the institute and with it the official form of Douglas's relation to myself have undergone some changes in the years that intervened; but never has there been any hint of change in the confidence and loyal friendship, in the quiet and unselfish help and coöperation, which he has given to me, as to every member of our growing staff of colleagues, through the sixteen years of our close collaboration. We had all come to know even much more of Douglas's scientific worth than his modest self-effacement showed outside our circle, and we all know that we have lost a colleague whose genius for friendship and unselfish instinct for adjustment have been of priceless value to the happy coöperation of our community."

Sir Patrick Laidlaw, F.R.S., writes:—

"It has been my great privilege to know Captain Douglas for the last fifteen years. This may seem a fair period but I feel it was not nearly long enough. Throughout most of this time I worked under him or with him at the National Institute for Medical Research, and to me, as to all other workers in the department of experimental pathology, which he largely helped to build, he was unfailingly kind in giving advice, encouragement, or criticism. For example, both Dunkin and I are greatly indebted to him for assistance in the distemper investigation. He was in close touch with all the virus studies under progress in his department, and indeed initiated some and frequently guided a whole research, though his name did not appear on the final publication. He brought to the study of virus problems a mind ripe with bacteriological knowledge and experience gained in India, China, and at St. Mary's Hospital with Sir Almroth Wright, to the great benefit of less mature research workers.

"Douglas was always keenly interested in 'acid-fast' bacilli and diseases produced by them. He developed special synthetic media for the cultivation of the tubercle bacillus and produced a stock of tuberculin prepared from such a medium for use in a projected international inquiry. He was greatly interested in biochemical studies in connexion with tubercle bacilli, and assisted the late G. A. C. Gough's chemical studies by growing the necessary bacilli in large quantities, suggesting and assisting in new lines of work. The work on Johne's disease of cattle carried out by Dunkin at the institute farm at Mill Hill was helped forward by Douglas in the early stages. The same story might be repeated; Douglas in the background initiating new studies, encouraging his juniors, allowing them full freedom to develop their own ideas, and kindly to a fault even when criticism was necessary. Apart from pathology, which was his life work, Douglas was a keen field naturalist particularly interested in bird life and migration—e.g., he published two papers on the migration of woodcock. He was an ardent fisherman and enjoyed a good day's shooting. At the institute there is a gap which will never be filled, and my colleagues and I feel we have lost a very good friend."

Dr. Leonard Colebrook writes:—

"My recollections of 'Dougie'—most lovable of men—range over the years 1906 to 1921. I see him in the early days of the 'opsonic' era at the midnight tea parties at St. Mary's along with 'The Old Man' as we always called Sir Almroth Wright (he was then only 45), delighting us all with good stories, and banter, and shrewd comment upon whatever the work of the day had thrown up. From the tea parties we went back to a further bout of counting of phagocytic films, and Douglas perhaps to wrestle with some problems of technique till 2 or 3 in the morning. In technical skill he was our recognised master, for, without any special training, he had acquired an uncanny sense of how a job should be done. Hence it was that he contributed not a little to the 'technique of the teat and the capillary glass tube,' although the fundamental ideas and the stimulus to work them out came nearly always from Sir Almroth.

"At the outbreak of the European war, Douglas was quick to see the urgent need for bacteriological media that would yield better crops than those in current use if we were to produce the huge quantities of typhoid vaccine which were required for the Allied armies. This matter had been simmering in his head for some time and in the early autumn of 1914 he was able to publish in THE LANCET a description of the tryptic digest medium which usually bears his name and has been so widely employed ever since. This must rank as one of his most useful achievements. It was something of a calamity

when he went to Boulogne with Wright a few months later and started to create a laboratory in a damp cellar for the study of wound infections. Very severe sciatica soon sent him home and crippled him for years, but in spite of constant pain and want of sleep he carried on all through the war with cheerful curses, but never a complaint, and did valuable work at St. Mary's directing researches on Gallipoli dysentery and on wound infections. In this work I think he was at his best—and very happy—for he had a real flair for clinical observation and wise treatment—seeing always the man as well as the disease.

"I count it great good fortune to have been so closely associated with one so disinterested and so essentially efficient in all he undertook. For the rest, it may be truly said of him that he 'warmed both hands before the fire of life.'"

### JEFFREY ALEXANDER AMHERST ORLEBAR, M.B., B.Chir. Camb.

Dr. J. A. A. Orlebar, whose death occurred on Jan. 1st at Hove, was honorary physician in charge of out-patients at Brighton and Preston Dispensary. He was 56 at the time of his death. Dr. Orlebar was the son of the Rev. J. E. Orlebar, rector of Glencarse, and was educated at St. John's School, Leatherhead, and Magdalene College, Cambridge, whence he proceeded for his medical training to St. Thomas's Hospital. He obtained the double English diploma in 1905 and graduated as M.B., B.Chir. Camb. in the same year. After holding an appointment at the Tewkesbury Hospital and acting as medical officer of health to the Brixworth rural district council, he was appointed house physician at the Royal Sussex County Hospital, Brighton, filling also the posts of assistant pathologist and bacteriologist. During the war he held a commission as temporary captain, R.A.M.C., and served in Suvla Bay, when his experience in the treatment of malaria led to his appointment as medical officer in charge of a tropical diseases clinic in connexion with the Ministry of Pensions. Apart from his purely professional work he took a practical interest in the St. John Ambulance Brigade and in the local activities of the British Medical Association.

### MURDO BUCHANAN, M.B., Ch.B. Glasg.

Dr. Murdo Buchanan, who died on Jan. 9th at Darlington, was born on the island of Lewis and was educated at the Nicolson Institute, Stornoway, and the University of Glasgow. At Glasgow he graduated as M.B., Ch.B. in 1907, and on qualification became for a time surgeon to the St. Helen's Collieries. Later he practised at Bishop Auckland, Durham, but since 1916 was a partner in a practice in Darlington. He enjoyed a high local reputation as physician and surgeon and was appointed deputy coroner some three years ago. He was also keenly interested in ambulance work. Although only 53 years of age his death was not unexpected, as he had been in failing health for some time.

### EDWARD ARGENT SAUNDERS, M.R.C.S. Eng.

THE death is announced at the age of 50, after a short illness, of Dr. Edward Argent Saunders, medical officer of health for Pembroke. The son of a well-known Welsh physician, he was educated at Epsom College and entered the medical school of the Middlesex Hospital, where he held the Freer Lucas scholarship. He took the English double diploma in 1912 and served as house surgeon at the Middlesex Hospital when he returned to practice in Pembroke where in the course of a busy and successful career he obtained a large number of public appointments, being at the time of his death medical officer of health and school medical officer for the borough of Pembroke, civil medical officer in charge of the R.A.F. station at Pembroke Dock, in charge of the county fever hospital, and medical officer of the Post Office. He was actively interested in the work of the St. John Ambulance Association and of the local infant welfare clinic. Dr. Saunders was a keen sportsman, good with gun and rod, and his unexpected death occurred on return from a shooting expedition.

### FRANCIS EDWARD FERNIE, M.R.C.S. Eng.

Dr. Francis Fernie, who died on Jan. 9th at Stone, at the age of 68, was a well-known and respected figure in the Stafford district. He was the eldest son of the late Dr. Edward Fernie, of Stone, was educated at Wellingborough school, and received his medical training at St. Bartholomew's Hospital. On qualifying with the English double diploma in 1893 he was for a time house surgeon at the Stockport Infirmary, returning to go into partnership with his father. As a young man Dr. Fernie was a prominent footballer, while to the end of his life he was a remarkably fine horseman.

## TREATMENT AND DISPOSAL OF LONDON SEWAGE

AT a sessional meeting of the Royal Sanitary Institute, held on Jan. 14th, Mr. J. H. Coste, chief chemist to the London County Council, described some improvements which had been made in treatment of the ever-increasing flow of sewage from the London main drainage system. The method of sedimentation, with or without the aid of chemical precipitants, which has been in use since the days of Sir Joseph Bazalgette and Mr. W. J. Dibdin, has been remarkably successful, but recently experience has shown that the calls which are being made upon the London main drainage system and on the capacity of the River Thames as the final place of disposal have reached a point when further steps should be taken. In his paper Mr. Coste described the large activated sludge plant designed on lines suggested by Lieut.-Colonel W. Butler and Mr. E. H. Tabor, M.I.C.E., as the result of long-continued research by the L.C.C.'s officers. This plant, in which aeration for treatment is almost entirely effected at the interface between the mixture of activated sludge and the sedimented effluent which is to undergo further purification, is so arranged that the liquid flows through a two-tiered long channel, divided into 66 compartments, alternately being exposed to air and plunging into the lower compartment. By details of construction there is imparted to it a swirling motion, so that the air-liquid interface is continually renewed and absorption of oxygen from the air goes on rapidly. After travelling 6400 feet (over a mile) the issuing liquid goes to sedimenting tanks of two types: pyramidal, which yield better separation of solid from liquid and shallow Dorr tanks with scrapers which yield a denser sludge; thence the liquid part flows into the common effluent channel and the sludge to reaeration tanks. These are fitted with diffuser tiles which have been found better adapted for aeration of sludge than the surface absorption used for the treatment itself. The plant

was constructed in the hope that it would suffice for treatment of from 5 to 10 million gallons a day. Since July, 1932, with very little intermission, 10 million gallons a day have been treated. At first it was sought to obtain a stable effluent; experiment has shown that the greatest effect of purification is obtained by producing a less purified effluent in greater amount.

A second direction of improvement has been explored in the form of sludge digestion, by means of which a large volume of gas of high calorific power is obtained, available for the production of heat and power, and a sludge of reduced organic content. The principal source of gas seems to be the mixture of fatty acids, present in part as soap in the sludge, and Mr. Coste and his colleagues have shown by micro-combustion and the difficulty in liquefying the gas that methane is the only hydrocarbon present in appreciable amount—a fact which has hitherto been assumed but not demonstrated. A large sludge digestion plant is to be constructed at the northern outfall, but this will supplement and not supplant disposal at sea; also five more units of activated sludge plant of the same capacity and on similar lines to that now in use are being constructed.

During the recent dry summers it has been found that some more thorough process than sedimentation, supplemented by the use of ferrous sulphate as a fixative for sulphuretted hydrogen, was needed for the hot dry months of the year. Experiments made in the winter of 1934 with a variety of oxidising agents showed that ferric salts were the most suitable for such emergency treatment. It was found, however, that the quantities required—hundreds of tons a week—could not be obtained commercially. Experiments were, therefore, initiated on the chlorination of ferrous sulphate, which was obtainable. These were successful on the laboratory scale and at once plant of sufficient size was constructed at the southern outfall, followed by an improved plant at the northern. The work was not completed sufficiently early in the year 1935 for an unsatisfactory condition of the river to be avoided entirely, but the character of the effluent was undoubtedly improved and it is hoped that with the ability to start treatment at any moment, the condition of the Thames may remain satisfactory during the summer months. When the five activated sludge units under construction are completed still better conditions should be secured. Mr. Coste expressed his personal opinion that further improvements should be in the direction of better sedimentation and coagulation of sewage which had been brought to the outfalls in a non-septic condition.

# MEDICAL NEWS

### University of Cambridge

A course of lectures on human genetics will be delivered during the Lent term by Dr. L. S. Penrose, research medical officer of the Royal Eastern Counties Institution, Colchester. The lectures will be given on Fridays, at 5 P.M., and the first will be on Friday, Jan. 24th.

### University of London

Prof. B. A. McSwiney has been appointed to the university chair of physiology at St. Thomas's Hospital medical school.

Dr. McSwiney, who was born in Chicago in 1894, received his medical education in Dublin. In 1915 he was awarded the Reuben Harvey scholarship by the Royal College of Physicians of Ireland for his work as student demonstrator in the school of physiology, but his work was interrupted by service as a naval surgeon-probationer. Returning to complete his medical course, he graduated as M.B. in 1917, worked for a time as assistant scientific adviser to the Ministry of Food, and in 1918 saw further war service with the R.A.M.C. After a brief period as assistant professor of physiology at Trinity College, Dublin, he went to Leeds in 1919 as university lecturer in experimental physiology, being appointed to the same post at Manchester a year later. He returned to Leeds in 1926 to fill the chair of physiology, and during his tenure of it has acted as examiner for the universities of Oxford, Cambridge, and Manchester, and for the National University of Ireland. His work has been largely concerned with pulse-wave velocity and the physiology of plain muscle, and he became a D.Sc. of Dublin in 1928.

Two lectures on perimetry will be given by Dr. H. M. Traquair, lecturer on diseases of the eye in the University of Edinburgh, at 5.30 P.M. on Feb. 10th and 11th, at University College Hospital medical school. On March 3rd, 6th, and 10th, at the same hour, Dr. Kuczynski, formerly director of the statistical office, Berlin-Schönberg, will lecture at University College on recent population trends. Lord Dawson will take the chair at his first lecture.

### Society of Apothecaries

A livery dinner of this society will be held at Apothecaries' Hall, Water-lane, London, E.C., on Tuesday, Feb. 25th, at 7.30 P.M., when the Lord Mayor and sheriffs intend to be present.

### Papworth Village Settlement

Dr. Walter Pagel will give a demonstration on the experimental production of early pulmonary tuberculosis in the Sims Woodhead memorial laboratory at Papworth Village Settlement on Saturday, Feb. 15th, at 3 P.M. All who are interested and wish to attend should communicate with Dr. Pagel at Papworth Hall, Cambridge.

### Society of Public Analysts

A joint meeting of this society with the food group of the Society of Chemical Industry will be held on Wednesday, Feb. 5th, at the Chemical Society's rooms, Burlington House, Piccadilly, London, W. The afternoon session begins at 5 P.M. and the evening session at 8.15 P.M., and both will be devoted to a discussion on tea and coffee, with special reference to their tannins and alkaloid. The first paper of the evening session will be read by Dr. G. Roche Lynch, who will speak on the pharmacology of caffeine and of tea and coffee.

### Dr. Barnardo's Homes

Last year 1396 children were admitted to Dr. Barnardo's Homes, among whom was the 118,000th child to be welcomed under the charter "no destitute child ever refused admission." The number at present in the Homes is about 8300, of whom 1455 are under 5 years of age.

### Prince of Wales's Hospital, Plymouth

Lord Onslow recently opened at this hospital a new administrative and paying patients' block which has cost £40,000. Twenty-six paying patients can be accommodated and there are now enough rooms to enable all the nurses to sleep in hospital.

### Ella Sachs Plotz Foundation

The trustees of this foundation are anxious to make known the resources of their fund for the advancement of scientific investigation. The foundation seldom or never offers stipends to investigators; nor does it provide apparatus and materials which are ordinarily part of laboratory equipment. Its special purpose is to give grants for the purchase of apparatus and supplies required for special investigations and for the payment of unusual expenses, including technical assistance. The research should bear closely on medicine or surgery, and the maximum size of grants will usually be less than $500. In the twelve years of its existence the foundation has made 252 grants and investigators have been aided in 26 countries. Applications for assistance should arrive before May 1st, including statements about the nature of the investigation, the amount of money wanted, and the way in which it will be spent. The secretary of the executive is Dr. Joseph C. Aub, Collis P. Huntington Memorial Hospital, 695, Huntington Avenue, Boston, Massachusetts, U.S.A.

### King Edward's Hospital Fund for London

In aid of this Fund five special tours have been arranged, beginning with a visit to the Board of Admiralty and the Foreign Office, conducted by Mr. D. B. Smith and Mr. C. Howard Smith, on Feb. 8th. The other places to be visited will be the Houses of Parliament (Feb. 19th), the India Office (March 7th), Westminster Abbey (April 22nd), and the Zoological Gardens (May 8th). Tickets may be had from the secretary of the Fund, 10, Old Jewry, London, E.C.2.

### German Congress for Actinotherapy

The third International Congress for Actinotherapy will be held in Wiesbaden from Sept. 1st to 7th under the presidency of Prof. W. Friedrich, director of the Institut für Strahlenforschung of the University of Berlin. Problems relating to the biology of light, to biophysics, and to the therapy of light will be discussed. Further information may be had from the secretary-general of the Congress, Dr. H. Schreiber, Robert Koch-Platz 1, Berlin, N.W.7.

### Fifty Years of Public Service

On Jan. 17th Dr. Henry Lloyd received a presentation to commemorate his 50 years as poor-law medical officer for St. Asaph and district, an appointment he has held since the age of 25. Dr. Lloyd's brother, the late Dr. David Lloyd, was for many years medical officer for Denbigh, and he has two daughters in the medical profession, Dr. Muriel Radford and Dr. Katherine Quinby. The presentation was made by the Lord-Lieutenant of Flintshire.

### Hospital Extensions at Southend

Southend borough council have decided to spend £304,000 on improving and extending the municipal hospital. There has been much opposition to the scheme on the ground of expense and the measure was passed only by a majority of 2.

### Boscombe Hospital

The enlargement of the nurses' hostel of this hospital will probably be finished in April and two new operating theatres, a new ward with 24 beds, and three observation wards are also in course of construction. It is hoped to build a new maternity block later in order to free medical and surgical wards.

### Paying Patients at Swindon

A scheme known as the Swindon and North Wilts Hospital Private Ward League is being inaugurated this month. An annual subscription of £1 1*s*. entitles a single man and £2 2*s*. a married man with a family to assistance in the cost of maintenance in the private wards of Swindon Victoria Hospital or in nursing-homes. X ray examinations and other expenses are included in the scheme. Full scale benefits are only payable after a year's membership.

### Society for Relief of Widows and Orphans of Medical Men

At a meeting of the court of directors held on Jan. 1st the president, Mr. V. Warren Low, being in the chair, the deaths of five members were reported and five new members were elected. Four widows of deceased members applied for relief; a grant of £60 a year was voted to each, one widow over 65 receiving an additional £15 a year; two orphans had grants of £50 a year each. A sum of £2082 10*s*. was voted to cover the half-yearly grants to the 55 widows and 10 orphans in receipt of relief. The distribution was reported of £625 as a Christmas gift to the widows and orphans, each widow over 75 receiving £15, under 75 £10, and each orphan £10. A legacy of £45 had been received from the executors of the late Dr. W. Culver James, a vice-president of the society. Particulars of membership, which is open to any registered medical man who at the time of his election is residing within a 20-mile radius of Charing Cross, may be obtained from the secretary at 11, Chandos-street, London, W. 1.

### Scottish Board of Control

Dr. Laura Margaret Dorothea Mill has been appointed a deputy commissioner of the General Board of Control for Scotland.

### Fellowship of Medicine and Post-Graduate Medical Association

Advanced courses will be held in proctology at St. Mark's Hospital (Feb. 3rd to 8th); in chest diseases at the Brompton Hospital (Feb. 10th to 15th); in gynæcology at the Chelsea Hospital (Feb. 10th to 22nd); and in anatomy and physiology for the F.R.C.S. (primary) in the Infants Hospital (Mondays, Wednesdays, and Fridays at 8 P.M., Feb. 24th to April 24th); and a M.R.C.P. clinical class will meet at the National Temperance Hospital, Hampstead-road, on Tuesdays and Thursdays from Feb. 25th to March 12th at 8 P.M. An all-day course in neurology will be given at the West End Hospital for Nervous Diseases (Feb. 3rd to 8th), and week-end courses include one in physical medicine at the St. John Clinic and Institute of Physical Medicine (Feb. 8th and 9th), one in children's diseases at the Princess Elizabeth of York Hospital (Feb. 22nd and 23rd), and one in chest diseases at the Brompton Hospital (March 7th and 8th). Courses are open only to members and associates. Full particulars and detailed syllabuses can be obtained from the secretary of the fellowship, 1, Wimpole-street, London, W.1.

### British Red Cross Society and Order of St. John Hospital Library

The organising secretary of this movement (48, Queen's-gardens, Lancaster Gate, London, W.2) announces the delivery on four Wednesday evenings at 5.30 P.M. of the following addresses at the Foyle Art Gallery, Charing Cross-road, London, W.C.2. On Jan. 29th Miss Ann Bridge will speak on the novel and the conventions; on Feb. 12th Miss Dorothy Sayers will speak on the importance of being vulgar; on Feb. 26th Mr. Humbert Wolfe will give readings from his own works; and on March 11th Mr. Maxwell Fry, A.R.I.B.A., and Mr. A. R. Duncan, A.R.I.B.A., will start a debate, the former instructing the audience how to live and the latter taking up the attitude that we should live as we like. Tickets for the course are 2*s*. 6*d*. for a single lecture and 8*s*. 6*d*. for four lectures. The hospital library run under the ægis of Red Cross and the Order of St. John merits all the support that medical men can either personally give it or direct towards it. The organisation already sends gifts of books to over 2000 hospitals, and the amount of pleasure and profit which patients derive therefrom must be extremely large.

### INDEX TO "THE LANCET," VOL. II., 1935

THE Index and Title-page to Vol. II., 1935, which was completed with the issue of Dec. 28th, is now in preparation. A copy will be sent gratis to subscribers on receipt of a post card addressed to the Manager of THE LANCET, 7, Adam-street, Adelphi, W.C.2. Subscribers who have not already indicated their desire to receive Indexes regularly as published should do so now.

## Appointments

GOODWIN, AUBREY, M.D. Lond., F.R.C.S. Eng., has been appointed Obstetric Surgeon to the Westminster Hospital.

HEWLETT, R. F. L., M.B., Pathologist at the Group Laboratory, Lambeth Hospital, L.C.C.

MACKAY, J. S. B., M.B. Aberd., D.P.H., Assistant Tuberculosis Officer for Manchester.

MCNAB, G. H., M.B. Edin., F.R.C.S. Eng., Surgical Registrar at the Hospital for Epilepsy and Paralysis, Maida Vale.

MILLER, ARTHUR, F.R.C.S. Edin., Consulting Oto-laryngologist to the Wimbledon Fever Hospital.

MILNER, J. G., M.B. Camb., F.R.C.S. Eng., Assistant Surgeon to the Royal Westminster Ophthalmic Hospital.

RUNDLE, FRANCIS, M.B. Sydney, F.R.C.S. Eng., Surgical Registrar at the Westminster Hospital.

# Medical Diary

*Information to be included in this column should reach us in proper form on Tuesday, and cannot appear if it reaches us later than the first post on Wednesday morning.*

## SOCIETIES

ROYAL SOCIETY OF MEDICINE, 1, Wimpole-street, W.
MONDAY, Jan. 27th.
*Odontology.* 8 P.M. Mr. Cyril Howkins: The Blood-supply of the Lower Jaw. Mr. R. Bradlaw: Innervation of the Teeth.
TUESDAY.
*Medicine.* 5 P.M. Dr. Otto Leyton: The Morbid Conditions which Cause Progressive Hyperglycæmic Glycosuria and the Circumstances which Modify its Course. Dr. J. Graham Willmore, Dr. H. P. Himsworth, and Dr. T. C. Hunt will also speak.

MEDICAL SOCIETY OF LONDON, 11, Chandos-street, W.
MONDAY, Jan. 27th.—8.30 P.M., Mr. V. Zachary Cope: The Treatment of Acute Appendicitis.

SOCIETY OF MEDICAL OFFICERS OF HEALTH, 1, Thornhaugh-street, W.C.
FRIDAY, Jan. 31st.—Mr. A. Felix, D.Sc., and Dr. C. J. McSweeney: The Serum Treatment of Typhoid Fever. (Fever group.)

## LECTURES, ADDRESSES, DEMONSTRATIONS, &c.

ROYAL COLLEGE OF SURGEONS OF ENGLAND, Lincoln's Inn Fields, W.C.
MONDAY, Jan. 27th.—5 P.M., Mr. E. P. Stibbe: The Anatomy and Surgery of the Subtentorial Angle.
WEDNESDAY.—5 P.M., Mr. R. T. Payne: Pyogenic Infections of the Parotid.
FRIDAY.—5 P.M., Mr. George A. Mason: Extirpation of the Lung. (Hunterian lectures.)

UNIVERSITY OF LONDON.
FRIDAY, Jan. 31st.—11 A.M. (London School of Hygiene, Keppel-street, W.C.), Mr. H. E. Magee, D.Sc.: Nutrition.

ROYAL INSTITUTION, 21, Albemarle-street, W.
FRIDAY, Jan. 31st.—9 P.M., Prof. E. Mellanby, F.R.S.: Advances in the Treatment of Disease.

HAMPSTEAD GENERAL AND NORTH-WEST LONDON HOSPITAL, N.W.
WEDNESDAY, Jan. 29th.—4 P.M., Dr. A. J. Scott Pinchin: Points in the Diagnosis and Treatment of Pulmonary Tuberculosis.

LONDON SCHOOL OF DERMATOLOGY, 5, Lisle-street, W.C.
TUESDAY, Jan. 28th.—5 P.M., Dr. J. L. Franklin: Bullous Eruptions.
WEDNESDAY.—5 P.M., Dr. I. Muende: Histopathology.
THURSDAY.—5 P.M., Dr. W. K. Sibley: Electrotherapeutics.

HOSPITAL FOR SICK CHILDREN, Great Ormond-street, W.C.
WEDNESDAY, Jan. 29th.—2 P.M., Dr. Wilfrid Sheldon: Medical Aspects of Empyema, Pulmonary Abscess, and Pyopneumothorax. 3 P.M., Dr. W. W. Payne: Blood Chemistry in Normal Respiration.
Out-patient clinics daily at 10 A.M. and ward visits at 2 P.M.

NATIONAL HOSPITAL, Queen-square, W.C.
MONDAY, Jan. 27th.—3.30 P.M., Dr. Hinds Howell: Neurosyphilis (I.).
TUESDAY.—3.30 P.M., Dr. Critchley: Cerebral Vascular Disease (I.).
WEDNESDAY.—3.30 P.M., Dr. Kinnier Wilson: Clinical Demonstration.
THURSDAY.—3.30 P.M., Dr. Carmichael: Subacute Combined Degeneration.
FRIDAY.—3.30 P.M., Mr. Elmquist: Demonstration of Re-educational Methods.
Out-patient clinic daily at 2 P.M.

FELLOWSHIP OF MEDICINE AND POST-GRADUATE MEDICAL ASSOCIATION, 1, Wimpole-street, W.
MONDAY, Jan. 27th, to SATURDAY, Feb. 1st.—ST. JOHN'S HOSPITAL, 5, Lisle-street, W.C. Afternoon course in dermatology. (Open to non-members.)—ST. PETER'S HOSPITAL, Henrietta-street, W.C. All-day course in urology.—NATIONAL TEMPERANCE HOSPITAL, Hampstead-road, N.W. Tues., 8.30 P.M., Mr. Hamilton Bailey: Neck. Thurs., 8.30 P.M., Mr. A. Dickson Wright: Skull and Brain.—Courses are open only to members of the fellowship.

SOUTH-WEST LONDON POST-GRADUATE ASSOCIATIO N.
WEDNESDAY, Jan. 29th.—4 P.M. (St. James's Hospital, Ouseley-road, S.W.), Mr. George Perkins: Fractures in General Practice.

LEEDS GENERAL INFIRMARY.
TUESDAY, Jan. 28th.—3.30 P.M., Mr. Jeaffreson: Antepartum Hæmorrhage.

LEEDS PUBLIC DISPENSARY AND HOSPITAL.
WEDNESDAY, Jan. 29th.—4 P.M., Mr. A. D. Sharp: Ear, Nose, and Throat—Selected Cases.

UNIVERSITY OF DURHAM.
SUNDAY, Feb. 2nd.—10.30 A.M. (Newcastle General Hospital), Mr. J. Collingwood Stewart: Selected Cases.

GLASGOW POST-GRADUATE MEDICAL ASSOCIATION.
WEDNESDAY, Jan. 29th.—4.15 P.M. (Eye Infirmary), Dr. J. Barbour Stewart: Squint and its Treatment.

# Vacancies

*For further information refer to the advertisement columns*

*Abyssinia (Gondar).*—Two M.O.'s. Each £600.
*Ayr Royal Burgh.*—M.O.H. £800.
*Barry Surgical Hospital.*—Res. Surg. O. £350.
*Bath, Royal United Hospital.*—H.S. At rate of £150.
*Beckenham, Bethlem Royal Hospital, Monks Orchard.*—Jun. Asst. Phys. £350.
*Birmingham City Maternity and Child Welfare Dept.*—Temp. M.O. £10 per week.
*Birmingham, Romsley Hill Sanatorium.*—Res. Asst. M.O. £240.
*Blackburn, Brockhall Institution for Mental Defectives, Langho.*—Jun. Asst. M.O. £500.
*Blackburn and East Lancashire Royal Infirmary.*—Res. Surg. O. £250.
*Bradford Royal Infirmary.*—H.S. At rate of £135.
*Bridport and Lyme Regis Boroughs, &c.*—M.O.H. £800.
*Buxton Clinic for Rheumatism and Allied Diseases.*—H.P. At rate of £200.
*Canterbury, Kent and Canterbury Hospital.*—H.P. At rate of £125.
*Central London Throat, Nose, and Ear Hospital, Gray's Inn-road, W.C.*—Third Res. H.S. At rate of £75.
*Chester Royal Infirmary.*—H.P. and H.S. Each £150.
*Colchester, Royal Eastern Counties' Institution for the Mentally Defective.*—Asst. M.O. £350.
*Doncaster Royal Infirmary.*—H.S. to Eye and Ear, Nose, and Throat Depts. £175.
*Downpatrick, Down Mental Hospital.*—Jun. Asst. M.O. £300.
*Dulwich Hospital, S.E.*—H.P. At rate of £120.
*East Ham Memorial Hospital, Shrewsbury-road, E.*—H.P. At rate of £150.
*Edmonton, North Middlesex County Hospital.*—Jun. Res. Asst. M.O. At rate of £250.
*General Lying-in Hospital, York-road, Lambeth, S.E.*—Jun. Res. M.O. and Anæsthetist. At rate of £100.
*Gloucestershire Royal Infirmary, &c.*—H.S. At rate of £150.
*Hertford, Ware Park Sanatorium.*—Asst. M.O. £300.
*Hove General Hospital.*—Hon. Phys. to Brighton Branch.
*Ipswich Sanatorium, Foxhall-road.*—Asst. M.O. £350.
*Lambeth Hospital, Brook-street, S.E.*—Asst. M.O. £350.
*Leeds General Infirmary.*—Hon. Asst. Phys.
*Leicester City General Hospital.*—Two Res. M.O.'s. Each £300.
*Liverpool, Mill-road Infirmary.*—Res. Asst. M.O. £200.
*Liverpool Sanatorium, Delamere Forest, Frodsham.*—Second Asst. Med. Supt. £200.
*Liverpool, Smithdown-road Hospital.*—Res. Asst. M.O. £200.
*Liverpool, Walton Hospital.*—Res. Asst. M.O. £200.
*London County Council.*—M.O. for Henniker House, Parsons Green. £100.
*Maidstone, Kent County Ophthalmic and Aural Hospital.*—H.S. to Ear, Nose, and Throat Dept. At rate of £200.
*Manchester Ear Hospital, Grosvenor-square, All Saints'.*—H.S. At rate of £150.
*Middlesex County Council.*—Asst. M.O. £600.
*Mile End Hospital, Bancroft-road, E.*—Asst. M.O. £350.
*Newcastle-upon-Tyne, Hospital for Sick Children.*—Res. Surg. O. £250.
*Northampton County Mental Hospital, Berrywood.*—Second Asst. M.O. £450.
*Paddington Hospital, Harrow-road, W.*—Asst. M.O. £350.
*Plymouth City.*—Deputy M.O.H. £750.
*Preston, Wrightington Hospital, Appley Bridge.*—Jun. Asst. M.O. £200.
*Princess Louise Kensington Hospital for Children, St. Quintin-avenue, W.*—H.P. At rate of £100.
*Queen's Hospital for Children, Hackney-road, E.*—Res. M.O. At rate of £200. Also H.S. and Cas. O. Each at rate of £100.
*Romford, Oldchurch Hospital.*—Asst. Res. Radiologist and Jun. Res. M.O. Each £250. Also General Consulting Phys. £300.
*Royal National Orthopædic Hospital, 234, Great Portland-street, W.*—Asst. Res. Surg. for Country Branch. £250.
*Royal Naval Medical Service.*—Eight vacancies.
*St. Alfege's Hospital, Vanbrugh Hill, S.E.*—Asst. M.O. £350.
*St. Andrew's, Devons-road, E.*—H.P. At rate of £120.
*St. George-in-the-East Hospital, Raine-street.*—Asst. M.O. £350.
*St. John's Hospital, Lewisham, S.E.*—Res. H.P. At rate of £100.
*St. Peter's Hospital, Vallance-road, E.*—Asst. M.O. £350.
*St. Thomas's Hospital, S.E.*—Reg. and Tutor to Obstet. Dept. £250. Also Reg. to Ophth. Dept. £150.
*Salisbury General Infirmary.*—H.S. At rate of £125.
*Shrewsbury, Royal Salop Infirmary.*—Res. H.S. At rate of £160.
*Shrewsbury, Salop Mental Hospital.*—Asst. M.O. £350.
*Southend-on-Sea General Hospital.*—Cas. O. At rate of £100.
*Stirling District Mental Hospital, Larbert.*—Jun. Asst. M.O. £300.
*Stockport Infirmary.*—H.S. £150.
*Stoke-on-Trent, Stanfield Sanatorium.*—Res. M.O. £250.
*West London Hospital, Hammersmith-road, W.*—Half-time Pathologist. At rate of £300.
*West Riding of Yorkshire County Council.*—School Medical Inspector. £500.
*Western Ophthalmic Hospital, Marylebone-road, N.W.*—Hon. Surg. to Inoculation Dept.
*Woolwich and District War Memorial Hospital, Shooters Hill, S.E.*—H.P. At rate of £100.
*Worcestershire County Council.*—County Analyst and Bacteriologist. £800.

The Chief Inspector of Factories announces vacancies for Certifying Factory Surgeons at Coggeshall, Essex; Frodingham, Lincs; and Auchtermuchty, Fife.

# NOTES, COMMENTS, AND ABSTRACTS

## A STUDY OF MILK CONSUMPTION IN AN OUTER LONDON SUBURB

BY E. H. R. SMITHARD, M.D. Lond., D.P.H.
MEDICAL OFFICER OF HEALTH, SOUTHALL

THE district council of Southall-Norwood has for many years supplied wet (as well as dried) milk, free or at half cost according to an economic circumstances scale, to expectant and nursing mothers and to children under three years of age attending the infant welfare centres. Children over three and under five years of age are also granted milk if there are definite medical reasons for its use. The procedure has been to write an order on a milkman chosen by the family, and as free choice has always been allowed, this has meant that the usual family milkman has supplied the milk and has been paid by the council.

The health department has been increasingly careful about the maintenance of cleanliness in the dairies of all retailers and there is no doubt that a great improvement has been made in the cleanliness of the milk retailed. From time to time, however, consistently unsatisfactory bacteriological results have been obtained from the milk of certain dairymen, and so it was decided to institute an investigation into the safety or otherwise of all the milk consumed in the district. The primary object of this investigation was in order to see if sufficient of the milk consumed was "safe" to warrant confining the council's payments to retailers who sold safe milk; the results may be of more general interest in showing the amount of milk consumed in an average London suburb.

Southall is a district, on the fringe of greater London, which has grown rapidly in recent years. There are about 100 factories of varying size in the area, but a proportion of the working population appears to be to an increasing extent of the dormitory type. The population, as calculated to the middle of 1934 by the Registrar-General, was nearly 47,000. It is almost certain that it is now (at the time of the investigation) just about 50,000. Of this figure, 3000 are resident in a mental hospital in the district, and this hospital, which has its own milk-supply, has been excluded from the figures given below, thus leaving a net population for the purpose of this investigation of 47,000. The area forms a convenient unit of its own with natural boundaries except in two small districts, and the figures given for the total consumption of milk may be taken as reliable.

The figures of milk consumed have been obtained from the retailers, in confidence as far as their names are concerned, and where the retailers have served both this and a neighbouring district an assessment has been made of the amount consumed in this district. I have no reason to doubt the reasonable accuracy of the totals submitted.

### GRADING

Table I. gives the grouped results of the investigation. Two columns have been included which show the difference between the largest and the smallest amounts of classified milks sold by individual retailers.

Of the pasteurised milk, excluding that done by the flash method, only 18 per cent. is pasteurised in the district, the rest being imported from firms outside. The milk so imported comes from eight different firms. Dalrymple-Champneys[1] has given

TABLE I

*Milk retailed during first week in October*, 1935. *Number of retailers*, 21; *total number of retail shops*, 41

| Description. | Number of retailers. | Amount sold in pints by retailers. | | Total sold—Pints and percentage. |
|---|---|---|---|---|
| | | Largest. | Smallest. | |
| 1. Legally pasteurised (including Grade A Past.) | 9 | 28,555 | 780 | 100,936 (62·15) |
| 2. Otherwise pasteurised— | | | | |
| (*a*) Ordinary | 9 | 7,680 | 1,200 | 34,244 (21·08) |
| (*b*) Flash .. | 1 | — | — | 13,500 (8·31) |
| 3. Certified .. | 2 | 124 | 3 | 127 (0·08) |
| 4. Grade A (T.T.) . | 6 | 237 | 12 | 553 (0·34) |
| 5. Grade A .. | 8 | 200 | 16 | 772 (0·48) |
| 6. Sterilised .. | 10 | 2,912 | 12 | 4,506 (2·78) |
| 7. Homogenised .. | 7 | 1,254 | 8 | 2,946 (1·81) |
| 8. Sun ray .. | 1 | — | — | 8 |
| 9. Raw .. .. | 3 | 2,800 | 10 | 4,810 (2·99) |
| | | Total .. | | 162,402 |

in detail the requirements for the proper supervision of milk pasteurising plants, but it has been felt for some time that a check on the end-result, more simple and reliable than bacteriological counts, which may be completely unreliable (Howell[2]) or which may appear satisfactory even when the milk is not properly pasteurised, is required. Kay and Graham,[3] of the National Institute of Research in Dairying at the University of Reading, have recently evolved a simple test which they claim will show—

(*a*) whether milk has been heated to 1½° F. below the minimum temperature for pasteurisation, or

(*b*) whether it has been heated (at 145° F.) for twenty minutes or less, instead of the required thirty minutes, or

(*c*) whether raw milk (down to 0·25 per cent.) has been mixed with properly pasteurised milk.

The principle is the hydrolysis of a phosphoric ester when incubated with milk containing phosphatase, and the colorimetric determination of the end-products. The enzyme phosphatase is a constant constituent of raw milk but is destroyed on heating to a certain temperature. This test, the phosphatase test, should prove very useful in checking the minimum requirements of a pasteurising plant. It does not however apparently indicate whether the maximum temperature (of 150° F.) has been exceeded, or by how much, or for how long, but this is immaterial when the only question is that of the safety of the milk examined.

Most of the pasteurised milk (legally, flash and otherwise) sold in this district was examined in this way by the National Institute of Research in Dairying, and of the sixteen samples submitted three failed to pass the test. Two of these were samples of flash pasteurised milk; the other was a sample of milk stated to be pasteurised but not sold as such. This related to a dairy selling 1600 pints of the above

total, and further inquiry revealed a reasonable certainty that raw milk had been added to it.

Excluding the milk to which these unsatisfactory results relate and also Nos. 7, 8, and 9 in Table I., a total of 139,738 pints is left (86 per cent. of the whole) which can be regarded as safe milk.

### BACTERIOLOGICAL RESULTS

A check was also made at the time, and has been repeated subsequently, by obtaining bacterial counts. These are well known to be frequently inconsistent, but in this district, using the same outside laboratory, quite consistent results are usually obtained. In the period under review the results appeared particularly consistent and they are shown in Table II.

TABLE II.—*Bacterial Counts*

| Description. | Number of samples. | Bacterial count. | | Samples in which *B. coli* found in | |
|---|---|---|---|---|---|
| | | Highest. | Lowest. | 0·1 c.cm. | 0·01 c.cm. |
| 1. Legally pasteurised | 4 | 85,000 | 8,300 | 1 | 0 |
| 2. Otherwise pasteurised— | | | | | |
| (a) Ordinary | 5 | 800,000* | 51,000 | 4 | 0 |
| (b) Flash | 4 | 31,200 | 9,000 | 2 | 1 |
| 3. Certified | 1 | 3,400 | | 0 | 0 |
| 4. Grade A (T.T.) | 4 | 91,600 | 10,000 | 1 | 0 |
| 5. Grade A | 4 | 4,000 | 100 | 0 | 0 |
| 6. Sterilised | 2 | 200 | 100 | 0 | 0 |
| 7. Homogenised | 1 | 6,000 | | 0 | 0 |
| 8. Sun-ray | 1 | 1,000 | | 0 | 0 |
| 9. Raw | 5 | Millions (3) | 92,000 | 5 | 4 |

*All the other samples were under 100,000.

These results are rather striking in that the only samples containing *B. coli* in 0·01 c.cm. are of raw milk (all except one of the samples submitted) and of flash pasteurised milk. The samples, too, in which *B. coli* were found in 0·1 c.cm. were mostly from dairies where the conditions generally obtaining were not such as to make these results unexpected. On the other hand, the sample of Grade A (T.T.) containing 91,000 organisms and *B. coli* in 0·1 c.cm. was a little surprising, and there must have been a slip up in the technique (although the result is well within legal standards). Some doubt, too, may be cast on a sample of Grade A milk containing only 100 organisms, but although it is not suggested that these analyses are of sufficient number to do more than indicate the gross differences between different milks, they are carried out at the same laboratory, and, as stated above, with similar conditions very consistent results are obtained.

### AMOUNT OF MILK CONSUMED

The Astor Committee [4] found that in January, 1918, the average consumption per head per day in London was just under a third of a pint. In August, 1925, the then Minister of Agriculture stated that the milk consumption per head of the population was 20 gallons a year. This is equivalent to about 0·44 pint per day, but probably did not take into account the amount used in manufacture of other articles for home consumption and for export. Variable figures for different towns and areas in Scotland are quoted by Paton and Findlay.[5] These ranged from 0·27 pint per man-value per day in a part of Glasgow in 1921, to 1·31 pints per man-value per day in an agricultural population in Ayrshire in 1924. These figures are roughly equivalent to 0·2 and 1·0 pints per head of population per day. Other investigations have been made from time to time into the amount of milk consumed per head of the population. In 1932 the Ministry of Health Advisory Committee on Nutrition [6] reported that the consumption per head was still less than half a pint a day. More recently Leighton and McKinlay [7] find that in large Scottish burghs the consumption was 0·417 pint, and in Scotland as a whole it was 0·479 pint. The Milk Marketing Board [8] this autumn (1935) state that the consumption is 0·38 pint per head per day, but that this is only approximate.

The figures in this present communication show that in Southall, taken as a whole, the average consumption per head per day is just under half a pint. There are, however, three modifying factors which should be considered:

1. The amount of milk used in food factories (artificial cream, bakeries, margarine works, &c.) and likely to be consumed in the district. Inquiry shows that approximately 200 pints should be deducted from the total on this account.

2. The amount of milk consumed by persons while working outside the district. This will cover lunch and possibly tea, and to a large extent it will be offset by the fact that another large number of people (in the factories, &c.) have lunch and tea in the district although living outside.

3. The amount of dried milk used. During the week in question 107 lb. of dried milk (equivalent to 616 pints) were sold from the infant welfare centres. I have also ascertained that almost exactly the same amount of dried milk (109 lb., equivalent to 627 pints) was sold at shops (chemists, &c.) in the district during the week in question.

These extras make practically no difference to the daily consumption, which is 0·497 or just under half a pint per head. It will be seen, therefore, that the consumption per head per day appears a little larger than in the Scottish burghs and definitely larger than for the country as a whole.

### COMMENT

Much opposition has been experienced from time to time by local authorities in obtaining powers for compulsory pasteurisation of milk. This has usually been based on the alleged rights of small traders, cost of plant, &c. The figures quoted in this communication are probably typical for any part of the metropolitan police area (covering 8,000,000 people) and indicate that there are in fact very few retailers who do not sell either pasteurised or otherwise safe milk, and that the total quantity of pasteurised or otherwise safe milk sold is a very high proportion of all milk sold. The time probably is at hand when standing committees on private bills, or even the Ministry, may be persuaded more easily to accept the principle of compulsory pasteurisation for all milk which is not otherwise bacteriologically controlled.

### SUMMARY

1. The milk-supply of an outer London suburb with 50,000 population is analysed.

2. The milk consumption per head is just under 0·5 pint daily.

3. The amount of efficiently pasteurised milk sold is 82 per cent. of the whole.

4. The amount of "safe" milk sold is at least 86 per cent. of the whole.

5. The phosphatase test has been found useful in deciding whether a pasteurising plant is turning out safe milk.

REFERENCES

1. Dalrymple-Champneys, W.: Min. of Health, Reps. Pub. Health and Med. Subjects No. 77, H.M. Stationery Office, 1935.
2. Howell, J. B.: THE LANCET, 1934, ii., 1073.
3. Kay, H. D., and Graham, W. R. Jun.: Jour. Dairy Research, 1935, vi., 191.
4. Quoted by Leighton and McKinlay: Milk Consumption in Scotland, Edinburgh, H.M. Stationery Office, 1934.
5. Med. Research Council, Spec. Rep. Ser. No. 101, H.M. Stationery Office, 1926.
6. Report on Diets in Poor-law Children's Homes: Memorandum on the Criticism and Improvement of Diets, H.M. Stationery Office, 1932.
7. Leighton and McKinlay: Loc. cit.
8. Private communication through Mr. H. E. Magee, D.Sc.

## THE REFORM OF MEDICAL STUDIES IN ITALY

THE proposals of the commission nominated by the Italian Ministry of Education have been published in the Italian medical press. The report recognises the grave gaps apparent in the education of the present general practitioner, and finds as causes (1) the licence which permits students to attend their later studies before passing the earlier examinations; (2) the number of natural sciences taught in the first two years; (3) the number of examinations in special subjects in the last year; and (4) the lack of practical clinical training. The commission recommends that the medical curriculum of six years should be divided into three periods of two years. During the first anatomy and physiology are to be studied for two years, and chemistry, physics, and biology for a year apiece. The student must pass in all five subjects before being admitted to the study of the subjects of the second period. In their second period are two-year courses in (1) general pathology, (2) special medical pathology, (3) special surgical pathology, and (4) pathological anatomy and histology with a course of one year in pharmacology and materia medica. Again the student must pass in all five subjects before entering on the last period of his training. In the last two years there are 11 compulsory and three special subjects. The compulsory subjects are: (1) clinical medicine, and (2) clinical surgery, in each case a two-year course, to be followed by six months of practical training. Diseases of children, obstetrics and gynæcology, hygiene, and forensic medicine are each to be studied during one year. Nervous and mental diseases, skin and venereal diseases, eyes, throat, nose and ear, and dental disease are each to be taught in a course of 25 lecture-demonstrations. In addition, the student must select, and be examined in, at least three of the following extra subjects: (1) biological chemistry, (2) general histology and embryology, (3) microbiology, (4) parasitology, (5) experimental psychology, (6) tuberculosis, (7) tropical diseases, (8) orthopædics, (9) radiology, (10) infectious diseases, (11) industrial medicine, (12) history of medicine, (13) urology, and (14) surgical anatomy and operative surgery. The instruction given in each of these subjects will also be in the form of 25 lecture-demonstrations.

It will be seen that the Italian student will now have to pass 24 examinations in order to obtain his degree in medicine and surgery. This is of interest to us as Italy is at present the only continental country whose medical degrees are registrable in this country.

## ARTIFICIAL PNEUMOTHORAX CENTRES IN HUNGARY

ON behalf of the Hungarian sanatorium and dispensary doctors Dr. Sandor Puder [1] has made a survey of pneumothorax treatment in the kingdom and of the centres where refills can be given. Questionnaires sent to hospitals, sanatoriums, dispensaries, and practitioners—274 in all, of whom 60 per cent. replied—showed that at the end of 1933 there were 2183 cases undergoing collapse therapy. It seems that there are each year 20,000 deaths from tuberculosis which, at three open cases to a death, would make 60,000 cases of open tuberculosis in the country. At a modest estimate 30 per cent. of these, or 18,000 cases, might be suitable for that form of treatment. How desirable it is that they should get it is evident from Dr. Puder's statement that 60 per cent. of cases so treated lose their bacilli. Every medical institution in the country should, he thinks, have an artificial pneumothorax centre, and where there are none new dispensaries should be provided. There should be specialists at the centres where the first puncture should always be made, but practitioners could, after some special training, do the refills. The patients should if necessary have their travelling expenses paid, the cost of the scheme being met in equal shares out of the taxes, rates, and national insurance, with the help of a special tuberculosis stamp.

[1] Ujabb Szempontok a Tuberculozis Ellenikuzdelemben, Budapest, 1935.

## THE CLIMATE OF PENMAENMAWR

Dr. DENNISON PICKERING, medical superintendent of Pendyffryn Hall, Penmaenmawr, writes: "During the spells of foggy and wintry weather which have occurred this winter the wireless and newspaper reports have described fog and wintry conditions as general, the only places specifically mentioned at various times as being free from such conditions being places in the south of England, particularly on the coasts. During the whole of this time, at Penmawnmawr, we have had no fog; snow on one occasion for a few hours only; frost perhaps four or five times, and only once lasting after breakfast time, and never more than a few degrees. There have also been a large number of bright sunny days.

"It seems hardly fair that this state of affairs on the North Wales coast should be passed over without comment, and that this district should be included in the general North Wales weather reports, which apply almost entirely to the inland mountainous districts. We are trying to obtain recognition of the fact that a portion of the North Wales coast enjoys a climate entirely different from the rest of North Wales, and comparing favourably with any other winter climate in the kingdom."

## AN ARMLESS VIOLINIST

THE autobiography of Hermann Unthan, a German born without arms, is worth reading.[1] Thanks to the remarkable character of his father and to his own determination he learned, among many other things, to play the violin with his feet and finally succeeded in supporting himself as a vaudeville artist. The story of his travels makes an excellent story, and Unthan overcame his disability to such an extent that the reader, absorbed in following his adventures, will occasionally tend to forget its existence. There are a few crumbs for the anatomist and the surgeon interested in the training of the physically handicapped, but the chief attraction of the book is in the personality of its courageous author

[1] The Armless Fiddler. By C. H. Unthan. London: George Allen and Unwin, Ltd. 1935. Pp. 287. 10s. 6d.

## CHILDREN IN TROUBLE

FRANKNESS in sex education is requisite for stemming sexual crime, not only by satisfying precocious curiosity and preventing early misconceptions of sex, but also by encouraging free discussion and sound thinking among adults. This is the wider aim of the Federation of Children's Moral Welfare Committees which, besides rescuing the victims of sexual perversion, provides speakers at meetings for mothers and social workers, and is willing to promote discussions in public-houses and workingmen's clubs. The work is hindered by the passive resistance of uninformed people who regard it as

meddlesome. The Holborn, St. Pancras, and Hampstead committee, of which Dr. Alan Moncrieff is chairman, had 99 new cases to deal with in 1935; of these 33 were preventive, the remainder were nearly all the results of indecent assault. Some of the children, whose circumstances and temperament make it desirable, are sent to institutions, but the majority are kept under the supervision of workers. The committee has been able to ensure special accommodation for the children when they appear at police-courts and stations, and their examination by women doctors. There is a great need for voluntary workers, both men and women, and the hon. secretary will gladly receive offers at 7, Ampthill-square, N.W.1.

### ON BEING AN INVALID [1]

THE musings of a musician whose practice of her art was hopelessly prevented by her condition of invalidism, make interesting reading, though many will be irritated with the extravagant terms of Monsieur Pierre Sanson's preface. The pages record the self-communings of the patient who appears to have been condemned to die by a famous professor in a few months or at longest in a year, but who none the less has survived for 15 years. The first section of the book entitled "The drama of the inner self" contains little that might not have been the experience of many chronically sick. The second part entitled "The drama of the environment" is more worth reading. Some of the sections on familiarity with disease, the obtuseness shown by the healthy towards it, the isolation from friendships, the risks of egoism, and the pain which may be inflicted upon the well by the ill contain much suggestive reading.

### "CONTENTMENT"

Messrs. CIBA LTD., 40, Southwark-street, London, S.E. 1, have issued an ornamental calendar for 1936, adorned with a pictorial frontispiece of unintentional medical significance. It is a delineation of "a fine old English gentleman, one of the olden time," sleeping off his dinner, and the details supplied by the artist suggest why the well-to-do classes in the earlier days of the Georges had a shorter tenure of life than their descendants of to-day enjoy. The artist, Mr. W. L. Grace, has produced a costume picture of a hearty squire who has dined and wined according to the standards of his time, has laid down his churchwarden, has drunk a final glass of toddy, and is now sleeping off the results. The picture, which is thoroughly well painted, judging by an effective reproduction, is labelled "Contentment"; it ought to be labelled "Beware," for undoubtedly the self-indulgent gentleman is asking for much pathological trouble.

"CELLONA TECHNIQUE" is the name of a handbook published by T. J. Smith and Nephew Ltd. (Neptune-street, Hull), which describes the use of their Cellona bandages in the treatment of fractures and also in veterinary practice. The text mainly consists of selections from papers appearing in English medical journals, and nearly all the illustrations are reproduced from Mr. K. H. Pridie's article on plaster technique, published in THE LANCET last autumn (1935, ii., 680 and 732). The Cellona bandage contains 90 per cent. (by weight) of plaster-of-Paris; it is moistened in about 10 seconds and sets firm in 5–10 minutes. The standard widths are from 1 to 6 inches, and in addition Cellona plaster slabs, Cellona lacquer (for waterproofing), and Cellona hook tape are obtainable. The handbook concludes with an informative article on fracture treatment taken from the *Medical Annual* of 1935.

THE DENMAN THUMB-GRIP DEVELOPER is held in the closed hand in such a way that a spring knob at one end is pressed inwards by the thumb. This exercises many muscles besides those of the thumb and finger, and it is claimed that nervous control as well as strength of hand and arm can be increased by keeping a pair in the pocket and gripping them occasionally. The training indeed may be helpful for golf or other games; but the producers (Denman Products Ltd., 169, Regent-street, London, W. 1) are perhaps unduly hopeful when they go on to suggest that the mental and physical concentration obtainable will "rebuild shattered nerves."

UNDER the title, "Suggested Standards for Milk Foods in Infant Feeding," Messrs. COW AND GATE LTD. (Guildford, Surrey) issue an attractive account of their aims and methods. They point out that their foods are prepared from Somerset and Dorset milk, and sold in sealed and dated tins. Poor or dirty milks produce powders which are low in solubility and high in acidity and do not keep well, and the Cow and Gate booklet describes the bonus schemes, farm inspections, and continual testing which ensure that the 9 million gallons used by the firm are fully satisfactory. Prepared by the "improved roller process" the powder is exposed to heat treatment at 98° C. for less than 3 seconds, and contains on an average 250 international units of vitamin D per pint of reconstituted milk, none being added artificially. Particulars are given of the 18 forms of dried milk manufactured, ranging from the standard full-cream and half-cream powders to such preparations as Caprolac, a goat's milk powder recommended for infants intolerant of cow's milk. Members of the medical profession are invited to visit the factories.

[1] The Glorious Bondage of Illness. By France Pastorelli. London: George Allen and Unwin Ltd. 1936. Pp. 224. 6s.

## Births, Marriages, and Deaths

### BIRTHS

FOX.—On Jan. 8th, at Guernsey, the wife of Dr. Maurice D. Fox, of a daughter.

FRANKLIN.—On Jan. 15th, at Devonshire-place, W., the wife of Richard H. Franklin, F.R.C.S. Eng., of a son.

O'RIORDAN.—On Jan. 15th, at Plymouth, the wife of Surgeon Commander T. J. O'Riordan, R.N., of a son.

SNOW.—On Dec. 20th, at Poona, the wife of Captain J. F. Snow, R.A.M.C., of a son.

STEEL.—On Jan. 20th, at Hillingdon, Middlesex, the wife of Dr. W. Arklay Steel, of a son.

WILSON.—On Dec. 3rd, at Sydney, Australia, the wife of Dr. Harold Wilson, of a daughter.

### MARRIAGES

BLACK—CHRISTMAS.—On Jan. 17th, at St. Mary-le-Strand, Charles Black, M.B., Ch.B. Glasg., of Alexandria, Dumbartonshire, to Mary Elizabeth, daughter of Mr. John Christmas, Blythwood, Enfield.

DAY—BAILEY.—On Jan. 11th, at Jullundur, Punjab, India, Capt. Peter Leigh Day, R.A.M.C., to Jean Metcalfe Bailey.

MCMULLAN—WARD.—On Jan. 9th, at the Priory Church, Great Malvern, William McMullan, L.R.C.P., D.P.H., to Rosamund Mabel, only child of Mr. A. H. Ward, O.B.E., Great Malvern.

STEVENS—DAVIS.—On Jan. 11th, at St. Mary's Church, Twyford, T. Russell Stevens, F.R.C.S. Eng., Dorchester, only child of Thos. G. Stevens, F.R.C.S., to Enid, younger daughter of Mr. Stanley Davis.

SWAN—WHITE.—On Jan. 14th, at Ballymore Parish Church, Tandragee, Dr. William David Swan, son of the late Mr. John Swan and of Mrs. Swan, Ballyshannon, to Dr. Elizabeth Barrington White, younger daughter of the late Mr. T. H. White and of Mrs. White, Orange Hill, Tandragee.

### DEATHS

BERNARD.—On Jan. 19th, at Fishponds, Bristol, Claude Bernard, M.R.C.S. Eng., aged 67.

BOND.—On Jan. 18th, at Woodbridge, Suffolk, of pneumonia, Bertram William Bond, M.B. Durh., M.R.C.S. Eng., aged 67.

DOUGLAS.—On Jan. 20th, at Buckingham-gate, S.W., Stewart Ranken Douglas, F.R.C.P. Lond., F.R.S., youngest son of the late James Alexander Douglas.

FISHER.—On Jan. 10th, at Oreston, near Plymouth, Herbert Wortley Fisher, M.R.C.S. Eng., son of the late John Fisher, Inspector-General R.N., aged 59.

VERNON.—On Jan. 19th, at a nursing-home, Ethel Miller Vernon, M.D. Lond., of Millbank, S.W., eldest daughter of the late Thomas Heygate Vernon.

***N.B.—A fee of 7s. 6d. is charged for the insertion of Notices of Births, Marriages, and Deaths.***